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GOVERNMENT REPORTS

Announcements & Index

Volume 81, Number 22 October 23, 1981

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* Committee on Scientific and Technical Information

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Subcategories: Astronomy; Astrophysics; Celestial Mechanics.

Category 4. Atmoshpheric Sciences

Subcategories: Atmospheric Physics; Meteorology.

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Subcategories: Conversion Techniques; Power Sources; Energy Storage.

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The full bibliographic report entries in this section are arranged by subject category and subcategory. Within each subcategory the reports are arranged alphanumerically by NTIS order number; the Ebcdic character set sort is used.

SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A100 620/4 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.

An Integral Prediction Method for Three-Dimensional Turbulent Boundary Layers on Rotating Blades.
Research and development rept.,
Nancy C. Groves. Jun 81, 52p Rept no. DTNSRDC-81/050
Presented at Propellers 1981 Symposium, Virginia Beach, VA, 26-27 May 81.

A general formulation of the boundary-layer computation scheme on the surface of a rotating blade is presented. Momentum-integral methods, together with the three-dimensional entrainment equation for a rotating disk, are used to calculate the three-dimensional turbulent boundary layer in an orthogonal streamline coordinate system. First-order finite-difference methods are used to solve the resulting boundary-layer equations. The unknown variables are the streamwise momentum thickness, the shape parameter, and the streamline slope at the surface. The boundary-layer calculation method is combined with existing geometrical and inviscid potential-flow computer codes for rotating blades to form an efficient turbulent boundary-layer computer code. For a given potential-flow solution, a typical boundary-layer computation requires less than 10 seconds computer time on the Burroughs 7700 high-speed computer. Boundary-layer predictions are presented for several rotating blades. Computed results are shown to be in agreement with experimental data for a simple rotating body. For the examples considered, displacement of the mid-chord point of a blade from a straight radial line is predicted to reduce the computed values of local skin friction coefficient, with an estimated increase in overall efficiency of about one percentage point. (Author)

AD-A100 820/0 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.

A Comparison of Various Techniques for the Prediction of Mass-Loaded Mode Shapes and Natural Frequencies.
Master's thesis,
Frank Broderick Atkinson. Mar 81, 130p Rept no. AFIT/GAE/AA/80D-1

The purpose of this investigation was to compare the results obtained from three modal prediction techniques. The first technique was an algorithm developed by Whaley for lightly damped structures (Method 1). Results using this algorithm were extracted from a thesis by Glenesk. The second method was the finite element method using NASTRAN (Method 2). The final method was the recovery of unloaded mass and stiffness matrices from the general matrix-vector differential equation of modal analysis using modal data obtained from an unloaded test item (Method 3).

AD-A100 824/2 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Numerical Solution of Incompressible Turbulent Flow Over Airfoils.
Doctoral thesis,
Harwood A. Hegna. Feb 81, 171p Rept no. AFIT/DS/AA/81-1

Numerical solutions are obtained for two-dimensional incompressible turbulent viscous flow over airfoils of arbitrary geometry. A body-fitted coordinate system is numerically transformed to a rectangular grid in the computational plane. The time dependent Reynolds averaged Navier-Stokes equations in the primitive variables of velocity and pressure are used. Turbulence is modelled with an algebraic eddy viscosity technique modified for separated adverse pressure gradient flows. The set of transformed partial differential equations is solved with an implicit finite difference method. Numerical solutions for a NACA 0012 airfoil near stall at a chord Reynolds number of 170,000 are favorably compared with surface pressure and velocity field measurements. A small laminar separation bubble near the suction pressure peak is observed. Computed lift and drag coefficients agree well with experimental values. (Author)

AD-A101 089/1 PC **A05**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Combined Influence of Free-Stream Turbulence and Favorable Pressure Gradients on Boundary Layer Transition and Heat Transfer.
Interim rept. 1 Jun 80-31 Mar 81,
M. F. Blair, and M. J. Werle. Apr 81, 98p UTRC/R81-914388-17, AFOSR-TR-81-0517
Contract F49620-78-C-0064

Experimental research was conducted to examine the combined effects of free-stream turbulence and streamwise acceleration on transitional boundary layer flows. During this period convective heat transfer coefficients, boundary layer mean velocity and temperature profile data, and wall static pressure distribution data were obtained for four combinations of streamwise acceleration and free-stream turbulence intensity. Free-stream multi-component turbulence intensity, longitudinal integral length scale, and spectral distribution data were obtained for the four test cases. The profile results indicate that the data are accurate and consistent and that the experimental boundary layers were highly two-dimensional. The freestream turbulence distributions generated for these tests have been shown to be both homogeneous and nearly isotropic. It is anticipated that these results will provide a needed set of fundamental, well documented experimental test cases to which analytical predictions can be compared. Examinations of the transitional profile shape factors and wall heat transfer distribution data indicate that fully turbulent mean velocity profiles are achieved upstream of fully turbulent wall heat transfer rates. The present data suggest that the turbulent mean velocity profile is established in a shorter length than is required for the development of the equilibrium turbulence distribution. Transition location data obtained in the present program agree very well with data from other flat wall studies. Suggested correlation curves are given for predicting flat wall transition locations with the combined effects of free-stream turbulence and streamwise acceleration.

AD-A101 094/1 PC **A08**/MF **A01**
United Technologies Research Center, East Hartford, CT.
The Influence of Free-Stream Turbulence on the Zero Pressure Gradient Fully Turbulent Boundary Layer.
Interim rept. 1 Jun 78-1 Jun 80,
M. F. Blair, and M. J. Werle. Sep 80, 169p UTRC/R80-914388-12, AFOSR-TR-81-0514
Contract F49620-78-C-0064

Experimental research has been conducted to determine the influence of free-stream turbulence on zero pressure gradient fully turbulent boundary layer flow. During this period convective heat transfer coefficients, boundary layer mean velocity and temperature profile data, and wall static pressure distribution data were obtained for five flow conditions of constant free-stream velocity and free-stream turbulence intensities ranging from approximately 1/4% to 7%. Free-stream multi-component turbulence intensity, longitudinal integral scale, and spectral distributions were obtained for the various turbulence levels. The test results with 1/4% free-stream turbulence indicate that these data are in excellent agreement with classic two-dimensional low free-stream turbulence, turbulent boundary layer correlations, thus establishing the absolute accuracy of the experiment. The data obtained for the test cases with higher free-stream turbulence indicate that the turbulence has a significant effect on turbulent boundary layer skin friction and heat transfer. It has been shown that these effects are a function of the free-stream turbulence intensity, the turbulence length scale, and the boundary layer momentum thickness Reynolds number. Suggested correlations for the influence of free-stream turbulence on skin friction, heat transfer, and Reynolds analogy factor are given. Also during this period, a boundary layer prediction method has been assessed as to its ability to predict free-stream turbulence effects on flat plate heating and skin friction. Comparisons with the experimental data obtained here showed that adequate predictions can be made for this case with an existing turbulence model. (Author)

AD-A101 095/8 PC **A15**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Data Report. Volume I. Velocity and Temperature Profile Data for Zero Pressure Gradient, Fully Turbulent Boundary Layers.
Interim rept. 1 Jun 78-31 Jan 81,
M. F. Blair. Jan 81, 328p UTRC/R81-914388-15, AFOSR-TR-81-0516
Contract F49620-78-C-0064
See also Volume 2, AD-A101 096.

Experimental research has been conducted to determine the influence of a free-stream turbulence on zero pressure gradient, fully turbulent boundary layer flow. Convective heat transfer coefficients, boundary layer mean velocity and temperature profile data, and wall static pressure distribution data were obtained for five flow conditions of constant free-stream velocity and free-stream turbulence intensities ranging from approximately 1/4% to 7%. Free-stream multi-component turbulence intensity, longitudinal integral scale, and spectral distributions were obtained for the various turbulence levels. Mean velocity and temperature profile data for the individual boundary layer traverses are presented in this report. (Author)

AD-A101 096/6 PC **A13**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Data Report. Volume II. Velocity and Temperature Profile Data for Accelerating, Transitional Boundary Layers.
Interim rept. 1 Jun 78-31 Jan 81,
M. F. Blair. Jan 81, 279p UTRC/R81-914388-16, AFOSR-TR-81-0515
Contract F49620-78-C-0064

Experimental research has been conducted to examine the combined effects of free-stream turbulence and favorable pressure gradients on flat-wall transitional boundary layers. Convective heat transfer coefficients, boundary layer mean velocity and temperature profile data, and wall static pressure distribution data were obtained for four combinations of free-stream turbulence intensity and favorable pressure gradient. Free-stream multi-component turbulence intensity, longitudinal integral scale, and spectral distributions were obtained for the various test cases. Mean velocity and temperature profile data for the individual boundary layer traverses are presented in this report. (Author)

AD-A101 125/3 PC **A06**/MF **A01**
California Univ., Berkeley. Graduate Div.
Viscous-Inviscid Interaction in Transonic Flow.
Doctoral thesis,
Laurence Byron Wigton. Jun 81, 115p AFOSR-TR-81-0538
Grant AFOSR-80-0230

The aim of this thesis is to couple an inviscid two dimensional steady transonic flow calculation with a boundary layer calculation. This interaction is especially important in transonic problems since the boundary layer has a significant effect on the inviscid portion of the flow. Here, the inviscid solution is obtained by an algorithm developed for the full potential equation by Holst and Ballhaus while the attached and separated turbulent boundary layer calculations are performed by Green's lag entrainment method. Guided by a model problem suggested by Le Balleur, a viscous-inviscid coupling algorithm is developed. Theoretical analysis indicates that it coverages rapidly for attached flows ad also performs well for separated flows. These conclusions are confirmed through a series of challenging transonic calculations involving both attached and separated flows. The coupling algorithm is remarkably stable and allows computation of coupled viscous-inviscid flows within times required to perform the inviscid calculations by themselves. (Author)

N81-26028/3 PC **A04**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 1: Summary.
1981, 71p NASA-CR-164513
Contracts NASW-3455, NASW-2342
Workshop Held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.

The state of the U.S. aeronautic industry and progressive changes in national priorities as reflected in federal unified budget outlays are reviewed as well as the contribution of NACA and the character and substance of U.S. aeronautical research under NASA. Eight possible roles for the future defined by NASA are examined and the extent to which the agency should carry out these activities is considered. The roles include: (1) national facilities expertise; (2) flight sciences research; (3) generic technology evolution; (4) vehicle class evolution; (5) technology demonstration; (6) prototype development; (7) technology validation; and (8) operations feasibility; How NASA's roles varies in the areas of military aviation, general aviation, transport aircraft aeronautics, rotorcraft aeronautics, engineering education, information dissemination, and cooperation with other organizations and agencies is discussed with regard to research in aerodynamics; structures and materials; propulsion; electronics and avionics; vehicle operations; and human engineering.

N81-26029/1 PC **A03**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 2: Military Aviation.
1981, 39p NASA-CR-164514
Contracts NASW-3455, NASW-2342
Workshop Held in Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.

While the National Aeronautics and Space Act of 1958 makes DOD primarily responsible for military aeronautics, it stipulates a role for NASA in providing direct and indirect support for national defense. The existing role of NASA in support of military aeronautics is working well and is well coordinated. The role needs only to be kept effective and then improved by increasing its responsiveness to changing military requirements and by the selective application of additional people. Funding resources should also be made available to NASA for research. Specific roles that NASA could or

should play were examined. It was determined that the most important areas for this support are in basic research, generic technology evolution, and facility support in the fields of aerodynamics, structures and materials, and propulsion.

N81-26030/9 PC **A03**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 3: Transport Aircraft.
1981, 39p NASA-CR-164515
Contracts NASW-3455, NASW-2342
Workshop Held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.

Segments of the spectrum of research and development activities that clearly must be within the purview of NASA in order for U.S. transport aircraft manufacturing and operating industries to succeed and to continue to make important contributions to the nation's wellbeing were examined. National facilities and expertise; basic research, and the evolution of generic and vehicle class technologies were determined to be the areas in which NASA has an essential role in transport aircraft aeronautics.

N81-26031/7 PC **A03**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 4: General Aviation.
1981, 36p NASA-CR-164516
Contracts NASW-3455, NASW-2342
Workshop Held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.

A substantially improved flow of new technology is imperative if the general aviation industry is to maintain a strong world position. Although NASA is the most eminently suited entity available to carry out the necessary research and technology development effort because of its facilities, expertise, and endorsement by the aircraft industry, less than 3% of its aeronautical R&T budget is devoted to general aviation aeronautics. It is recommended that (1) a technology program, particularly one that focuses on improving fuel efficienty and safety, be aggressively pursued by NASA; (2) NASA be assigned the role of leading basic research technology effort in general aviation up through technology demonstration; (3) a strategic plan be developed by NASA, in cooperation with the industry, and implemented in time for the 1982 budget cycle; and (4) a NASA R&T budget be allocated for general aviation adequate to support the proposed plan.

N81-26032/5 PC **A03**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 5: Rotorcraft.
1981, 39p NASA-CR-164517
Contracts NASW-3455, NASW-2342
Workshop Held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.

The potential roles for NASA relating to rotorcraft are reviewed. The agency's participation is delineated for each role, a rationale is provided, the current level of activity is summarized, and suggestions are given for the kinds of research still needed. In examining opportuntites for the most beneficial deployment of its resources, NASA should consider societal benefits as well as the military and civil markets in formulating the role it can play to support the development of a stronger rotorcraft technology base.

N81-26033/3 PC **A02**/MF **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 6: Aeronautical Research.
1981, 25p NASA-CR-164518
Contracts NASW-3455, NASW-2342
Workshop Held at Woods Hole, Mass. 27 Jul. - 2 Aug. 1980.

While each aspect of its aeronautical technology program is important to the current preeminence of the United States in aeronautics, the most essential contributions of NASA derive from its research. Successes and challenges in NASA's efforts to improve civil and military aviation are discussed for the following areas: turbulence, noise, supercritical aerodynamics, computational aerodynamics, fuels, high temperature materials, composite materials, single crystal components, powder metallurgy, and flight controls. Spin offs to engineering and other sciences explored include NASTRAN, lubricants, and composites.

N81-26034/1 PC **A01**
National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
Nasa's Role in Aeronautics: A Workshop. Volume 7: Background Papers.
1981, 185p NASA-CR-164519
Contract NASW-3455
Workshop Held at Woods Hole, Mass., 27 Jul. - Aug. 1980.

The nature and implications of the current state of U.S. aviation in a world setting are examined as well as their significance for NASA's role in the nation's aeronautical future. The outlook for the 1980's is examined from the point of view of legislation, economics and finance; petroleum; manpower, metallic materials, general aviation; military aviation; transport aircraft developments; and helicopters. Possible NASA assistance to DOD and the FAA is examined and the evolution of NACA and NASA in aeronautics and of NASA's aeronautics capabilities are described.

N81-26072/1 PC **A03**/MF **A01**
Stanford Univ., CA.
Strake/delta Wing Interactions at High Angles of Attack.
M. I. G. Bloor, and R. A. Evans. Apr 80, 36p
NASA-CR-166183, SU-JIAA-TR-30
Contract NCC2-55

The method of vortex discretization is used to analyze the interaction of the vorticity generated by a strake, with the flow over a delta wing. The validity of the approach is first established by making comparisons with established methods for dealing with delta wings, after which compound delta planforms are discussed. An understanding of the favorable interference effects normally associated with this type of configuration is obtained and results are presented to quantify the expected lift increments resulting from the strake interaction.

N81-26074/7 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
TAIR: A Transonic Airfoil Analysis Computer Code.
F. C. Dougherty, T. L. Holst, K. L. Grundy, and S. D. Thomas. May 81, 91p NASA-TM-81296, A-8594

The operation of the TAIR (Transonic AIRfoil) computer code, which uses a fast, fully implicit algorithm to solve the conservative full-potential equation for transonic flow fields about arbitrary airfoils, is described on two levels of sophistication: simplified operation and detailed operation. The program organization and theory are elaborated to simplify modification of TAIR for new applications. Examples with input and output are given for a wide range of cases, including incompressible, subcritical compressible, and transonic calculations.

N81-26117/4 PC **A02**/MF **A01**
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
Flag-Lag-Torsional Dynamics of Extensional and Inextensional Rotor Blades in Hover and in Forward Flight.
Semiannual Progress Report, Jan. - Jun. 1981.
M. R. M. Crespodasilva. Jun 81, 3p NASA-CR-164475
Contract NAG2-38

The formulation of differential equations of motion for both extensional and inextensional rotor blades, and the effect of cubic nonlinearities was examined. The developed differential equations are reduced to a set of three integro partial differential equations for a hingeless blade by eliminating the extension variable. Aerodynamic forces are modelled using Greenberg's extension of Theodorsen's strip theory. Equations of motion are expanded into polynomial nonlinearities to evaluate the motion of the system.

N81-26495/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Application of Constrained Optimization to Active Control of Aeroelastic Response.
J. R. Newsom, and V. Mukhopadhyay. Jun 81, 15p NASA-TM-83150
Presented at the Joint Automatic Control Conf., Charlottesville, VA., 18-19 Jun. 1981.

Active control of aeroelastic response is a complex in which the designer usually tries to satisfy many criteria which are often conflicting. To further complicate the design problem, the state space equations describing this type of control problem are usually of high order, involving a large number of states to represent the flexible structure and unsteady aerodynamics. Control laws based on the standard Linear-Quadratic-Gaussian (LQG) method are of the same high order as the aeroelastic plant. To overcome this disadvantage of the LQG mode, an approach developed for designing low order optimal control laws which uses a nonlinear programming algorithm to search for the values of the control law variables that minimize a composite performance index, was extended to the constrained optimization problem. The method involves searching for the values of the control law variables that minimize a basic performance index while satisfying several inequality constraints that describe the design criteria. The method is applied to gust load alleviation of a drone aircraft.

N81-26496/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Qualitative Comparison of Calculated Turbulence Responses with Wind-Tunnel Measurements for a DC-10 Derivative Wing with an Active Control System.
B. Perry, Iii. Jun 81, 13p NASA-TM-83144, AIAA-81-0567
Presented at the Aiaa Dyn. Specialist Conf., Atlanta, 8-11 Apr. 1981.

Comparisons are presented analytically predicted and experimental turbulence responses of a wind tunnel model of a DC-10 derivative wing equipped with an active control system. The active control system was designed for the purpose of flutter suppression, but it had additional benefit of alleviating gust loads (wing bending moment) by about 25%. Comparisions of various wing responses are presented for variations in active control system parameters and tunnel speed. The analytical turbulence responses were obtained using DYLOFLEX, a computer program for dynamic loads analyses of flexible airplanes with active controls. In general, the analytical predictions agreed reasonably well with the experimental data.

1B. Aeronautics

AD-A100 733/5 PC **A06**/MF **A01**
Federal Aviation Administration, Washington, DC.
The Effect of the Airline Deregulation Act on the Level of Air Safety. Annual Report of the Secretary of Transportation to the United States Congress Pursuant to Section 107 of the Airline Deregulation Act of 1978 (P.L. 95-504).
Jan 80, 102p

This report was prepared in response to the requirements of section 107 of the Airline Deregulation Act of 1978 (P.L. 95-504). It reviews the impact of deregulation on air carrier operations in calendar year 1979, with emphasis on the carriers extensively involved in scheduled domestic passenger service in the contiguous United States and statistically explores the accident, incident and vio-

lation records of these carriers. The statistical data from calendar year 1979 does not show that the level of air safety was adversely affected by deregulation. There were no accidents in which deregulation was determined to be a direct causal factor. The accident and fatal accident rates for certificated route carriers closely parallel those of previous years. Only the fatality number and rate, resulting from two accidents of wide-bodied jet aircraft, were higher. The commuter airline accident and fatal accident rates for 1979 remained comparably similar to the past 4 years of reported data, while the commuters experienced one of their highest traffic growth rates as a result of the stimulus provided by deregulation. (Author)

AD-A101 137/8 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Optimization of Strategic Airlift in-flight Refueling.
Master's thesis,
Vernon P. Bordelon, Jr., and John C. Marcotte, Jr. Mar 81, 214p Rept no. AFIT/GST/OS/81M-3

During the 1980s increases in the potential use of Strategic Airlift to transport equipment and personnel is anticipated. The capabilities of Strategic Airlift aircraft are extended through the inclusion of efficient in-flight refueling. The primary objective of this research was to develop a method which determines the combination of in-flight refueling rendezvous point, takeoff fuel loads and tanker base which results in the minimum total fuel consumption for an airlifter and tanker aircraft. The experimental design included the creation of two models. An analytic flight planning model determined the optimal rendezvous point and the takeoff fuel loads for the aircraft in a specific mission scenario. A SLAM simulation model verified the operational feasibility of the results of the analytic model by simulating the flights of aircraft.

PAT-APPL-6-242 817 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Improved Aerial Day/Night Refueling Stations.
Patent Application,
Harry L. Lask. Filed 11 Mar 81, 13p AD-D008 532/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved aerial refueling system, suitable for operation under nighttime or other limited visibility conditions, is described, and comprises a tanker aircraft with refueling boom depending rearwardly thereof, a receiver aircraft having a fuel receptacle for interconnection with the boom, means disposed on the tanker for illuminating the receiver aircraft with infrared light during hookup and refueling, infrared sensitive viewing means and an optical imaging device on the tanker through which the boom operator may view the boom and receiver aircraft to guide the boom into position for connection with the receiver aircraft. (Author)

PB81-910407 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Continental Airlines/ Air Micronesia, Inc. Boeing 727-92C, N18479, Yap Airport, Yap, Western Caroline Islands, November 21, 1980.
27 May 81, 52p NTSB-AAR-81-7
Paper copy also available on subscription, North American Continent price $50.00/year; all others write for quote.

At 0952 local time, on November 21, 1980, Continental Airlines/Air Micronesia, Inc., Flight 614, a Boeing 727-92C, N18479, crashed while attempting to land on runway 7 at Yap Airport, Yap, Western Caroline Islands. The aircraft touched down 13 feet short of the runway and the right main landing gear immediately separated from the aircraft. The aircraft gradually veered off the runway and came to rest in the jungle about 1,700 feet beyond the initial touchdown. Fire erupted along the right side of the aircraft as it came to a stop. All 73 occupants (67 passengers and 6 crewmembers) escaped before fire destroyed the aircraft. Three persons received serious injuries; the remainder received minor or no injuries.

1C. Aircraft

AD-A100 691/5 PC **A03**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Environment and Energy.
Helicopter Noise Exposure Level Data: Variations with Test Target. Indicated Airspeed, Distance, Main Rotor RPM and Takeoff Power,
J. Steven Newman. 10 Jul 80, 37p Rept no. FAA-AEE-80-34

This report provides uncorrected noise exposure level data measured using an integrating sound level meter at a single measurement location during the recently completed, week long, FAA helicopter noise test. In addition to the measurements reported, primary acoustical measurements were conducted. This acoustical data (acquired for nine microphones) will be combined with flight path track data processed at the FAA, Dulles Noise Laboratory by D. W. Ford. Meteorological data acquired from surface readings and radiosondes will be processed by U.S. Weather Service personnel.

AD-A100 696/4 MF **A01**
Sanders and Thomas, Inc., Pottstown, PA.
Application of an In-Line Contamination Monitoring Unit to the AHT-64 Hydraulic Test Stand.
Final rept. 13 Mar 78-30 Sep 80,
P. M. O'Donnell, and E. W. Roberts. 4 Jun 81, 116p NAEC-92-146
Contract N00140-80-C-0053
See also Rept. no. NAEC-GSED-105 dated 14 Jun 77, AD-A040 969.
Availability: Microfiche copies only.

This report documents a support engineering analysis establishing parameters, including vibration environment, for development and application of an in-line contamination monitor on the Portable Hydraulic Test Stand AHT-64 to indicate attained degree of particulate decontamination of return hydraulic fluid. Approaches are evaluated, concepts presented, and recommendations made. (Author)

AD-A100 730/1 PC **A14**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Hydraulic Diagnostic Monitoring System.
Final rept. Jan 79-Oct 80,
John J. Duzich. 2 Mar 81, 303p NADC-TR-81073-60
Contract N62269-78-C-0041
See also Rept. nos. NADC-TR-76389-30, AD-A077 552 and NADC-75168-30.

Task I encompassed the design, development and procurement of hardware, sensors, and microprocessors for two diagnostic monitoring systems. The first system was installed on the F-14 Hydraulic Flight Simulator on Task II of the program. Task II included the installation of one system on the F-14A Hydraulic Simulator for system component reliability demonstrations. The task also covered simulated component failures and diagnostic system reaction. In Task III, the Diagnostic System was integrated into A6E B/N 155628. The system was debugged and a 12 month flight test schedule. This report covers Task III. (Author)

AD-A100 761/6 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Interpolating Subroutine for High Power System Design.
Master's thesis,
Gerald D. Clark. Dec 80, 64p Rept no. AFIT/GE/EE/80D-14

The Aero Propulsion Laboratory is currently developing a computer-aided design program for high power airborne systems. An important part of this design program will be the feasibility study which was to be based on summary algorithms. These algorithms were to relate the weight and volume of each system component to the contributing operating parameters. This study first centers on the requirements for an interpolation scheme to form the summary algorithms. The scheme will need to work in at least four dimensions and produce accurate results over wide ranges. The advantages of the two possible interpolation approaches (algorithm development and direct interpolation) are described. The results of this comparison show clear advantages in the direct interpolation approach using stored data. The remainder of this study is a description and evaluation of the subroutine which was developed, INTERP. It has the flexibility to interpolate a data array with two or more independent variables and will output the values of any number of dependent variables. The routine also compensates for missing values in the known data array and issues an error message to the user when a test point beyond the data range is input. (Author)

AD-A100 794/7 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Direct Digital Design Method for Reconfigurable Multivariable Control Laws for the A-7D Digitac II Aircraft.
Master's thesis,
David W. Potts. Dec 80, 144p Rept no. AFIT/GE/EE/80D-36

This thesis investigates control of an aircraft when there is a primary control surface failure. The object of this study is to reconfigure the remaining control surfaces to compensate for the additional forces and moments generated by the inoperative control surface. To study this flight control problem, a comprehensive aircraft model is required which considers each control surface operating individually. A six degree-of-freedom aircraft model is developed, including all the individual control surfaces. A control surface input can produce both a lateral and/or a longitudinal response. Thus, the equations of motion cannot be decoupled for the design of the control laws. The coupling between the axes requires the derivation of several new non-dimensional control derivatives. Using the geometrical properties of the aircraft and the Digital Datcom computer program, the needed control derivatives are derived. The entire eigenstructure assignment method is used to assign both the eigenvalues and the eigenvectors to the closed-loop plant matrix. This method is used for the direct digital design of a multivariable discrete regulator and tracker control law. The effect of increasing the number of control inputs on the relative degree of controllability of the states was determined by singular value decomposition.

AD-A100 917/4 PC **A05**/MF **A01**
Payne, Inc., Annapolis, MD.
Wind Tunnel Measurements of Total Force and Extremity Flail Potential Forces on a Crew Member in Close Proximity to a Cockpit.
Final rept. Jun 77-Feb 80,
Harold L. Newhouse, Peter R. Payne, and James P. Brown. Dec 80, 90p AMRL-TR-79-110
Contract F33615-77-C-0523

In order to determine the aerodynamic forces acting upon a crewmember/escape seat combination at transonic speeds, and the flail potential forces acting on the crewmember's extremities, an existing half scale man/seat combination was integrated with a model of the forward portion of the F-16. The combination was tested in the Arnold Engineering Development Center Propulsion Wind Tunnel (PWT) Facility Transonic Wind Tunnel (16T) during the period September 9 to September 15, 1978, over the Mach number range 0.4 to 1.2. The basic data obtained in this way are reported in Reichenau. The present report describes the experimental set-up in detail and presents some typical force and force area (force/sq. q) plots. From earlier work it was determined that the flow over the model was 'supercritical', implying a turbulent boundary layer at separation, and a reasonably realistic simulation of full-scale conditions. Very marked interference effects were observed on the man/seat combination, due to fuselage proximity. The most dramatic were large increases in upper arm and upper leg flail potential forces. In almost all cases, the most severe interference occurred when a 'flow diverter' was mounted in front of the cockpit. Comparisons with other sources of data revealed generally good agreement, except that the drag of the model was somewhat low; presumably due to the fact that the model was smoother than its full scale equivalent. (Author)

AD-A100 946/3 PC **A03**/MF **A01**
Army Aviation Engineering Flight Activity, Edwards AFB, CA.

AH-1S(PROD) Airworthiness and Flight Characteristics for Instrument Flight.
Final rept. May-Aug 80,
John S. Tulloch, John D. Ottomeyer, Charles E. Frankenberger, Jr., and Bartholomew d. Picasso, III. Nov 80, 47p Rept no. USAAEFA-79-08

The United States Army Aviation Engineering Flight Activity conducted an Airworthiness and Instrument Flight Characteristics evaluation of a Production AH-1S (Prod) to determine potential for the AH-1S with Enhanced Cobra Armament System (ECAS) to meet instrument meteorological conditions qualification criteria. The test aircraft was configured with two tube launched, optically tracked, wireguided (TOW) missile launchers on each outboard wing stores station and a 7-tube lightweight launcher on each inboard wing stores station. The test consisted of 16.3 flight hours which were flown during 12 test flights. Four deficiencies and seven shortcomings associated with flying the AH-1S in instrument flight conditions, were identified. The deficiencies identified were: (1) Unsatisfactory cyclic control system mechanical characteristics; (2) large pitot-static system airspeed errors in climb and descent; (3) Easily excited lateral gust response; (4) Vertigo-inducing location of radio control panels. Five specification noncompliances were noted. The AH-1S (Prod) is not suitable for flight in instrument meteorological conditions, which infers tht the AH-1S (ECAS) will also not be suitable. (Author)

AD-A101 016/4 PC **A14**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Subsystem Testing and Flight Test Instrumentation.
Conference proceedings.
Apr 81, 322p Rept no. AGARD-CP-299
Presented at the Flight Mechanics Panel Symposium on Subsystem Testing and Flight Test Instrumentation, Geilo (Norway), 27-30 Oct 80.

The proceedings consist of the papers presented at the FMP Symposium on Subsystem Testing and Flight Test Instrumentation. The papers cover: navigation/attack systems testing, aircraft systems testing, environmental testing, and instrumentation techniques. (Author)

AD-A101 017/2 PC **A12**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Helicopter Fatigue Life Assessment.
Conference proceedings.
Mar 81, 264p Rept no. AGARD-CP-297
Presented at the Meeting of the AGARD Structures and Materials Panel (51st), Aix-en-Provence (France), 14-19 Sep 80. Preface in French.

The major objective of this Meeting was to take a further step towards the collection of experience on the fatigue evaluation and substantiation of new helicopters. The Meeting included surveys of current procedures and service experience, consideration of new concepts associated with the introduction of new technologies such as composite materials, new philosophies relevant to service damage and combat damage, and a review of testing techniques and methodologies for airframes and dynamic components. Finally, presentations were made on a European exercise aimed at the development of standardized fatigue load histories for helicopter rotors. (Author)

AD-A101 136/0 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Quantifying Reactive Maneuvers.
Master's thesis,
John J. Alt. Mar 81, 221p Rept no. AFIT/GST/OS/81M-1

There is currently no value of survivability attributed to an aircraft's reactive maneuver capability. In this experiment, exposure to enemy ground threats for various levels of information feedback to the aircrew were compared. This was done in an attempt to isolate the maneuverability factor. The Threat Model Penetration Simulation Analysis (TMPSA) model produced by the University of Dayton Research Institute was the penetration model used. The conclusion of this experiment was that only order of magnitude differences in capabilities can be captured with this model. It is recommended that two simple changes be made to TMPSA. These changes would allow more precise values for reactive maneuvers to be derived. (Author)

AD-A101 186/5 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Survivability Study of a FLIR Equipped Fighter on a Night Penetration of a Soviet Army.
Master's thesis,
Warren J. Leek, and Richard W. Schmitt. Mar 81, 161p Rept no. AFIT/GST/OS/81M-9

The LANTIRN system provides the fighter pilot with a forward looking infrared (FLIR) system, which allows him to fly the aircraft lower and faster than he would otherwise be able to fly. The objective of this research effort was to determine whether this increased capability will significantly improve the fighter's survivability in the night interdiction role. The problem was studied in the context of the threats and terrain found in the central region of West Germany. A model of the terrain features and threat scenario was constructed using the SLAM computer simulation language. The Soviet defensive systems can be moved around as desired, and aircraft can enter the system at a variety of arrival intervals, airspeeds, and altitudes. Defensive systems that are within range of the aircraft will shoot at it, provided they are not tied up with a previous aircraft, blocked by terrain, or prevented from shooting because of a low probability of kill. The capability to fly faster did not significantly increase the fighter's survivability. A decrease in altitude from 1000 feet to 500 feet increased survivability to a minor degree, while a further decrease to 250 feet improved survivability significantly. These findings led to the conclusion that a strong effort should be made to develop a FLIR of high enough resolution to allow the pilot to fly the mission at an altitude of 250 feet or below. (Author)

N81-26076/2 PC **A08**/MF **A01**
De Havilland Aircraft of Canada Ltd., Dowsview (Ontario).
Phase 2 and 3 Wind Tunnel Tests of the J-97 Powered, External Augmentor V/STOL Model.
D. B. Garland. Oct 80, 148p NASA-CR-152380, DHC-DND-80-1
Contract NASW-2797

Modifications were made to the model to improve longitudinal acceleration capability during transition from hovering to wing borne flight. A rearward deflection of the fuselage augmentor thrust vector is shown to be beneficial in this regard. Other agmentor modifications were tested, notably the removal of both endplates, which improved acceleration performance at the higher transition speeds. The model tests again demonstrated minimal interference of the fuselage augmentor on aerodynamic lift. A flapped canard surface also shows negligible influence on the performance of the wing and of the fuselage augmentor.

N81-26078/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Procedure for Designing Forebodies with Constraints on Cross-Section Shape and Axial Area Distribution.
R. L. Barger. Jul 81, 14p NASA-TP-1881, L-14516

A method is described for designing a forebody with cross sections which vary smoothly from an initial prescribed nose shape to a different prescribed base shape in such a way that the cross-section areas conform to a preassigned axial area distribution. It is shown that these conditions can be satisfied with a remaining degree of freedon, which can be used to accomplish a modest amount of geometric or pressure tailoring of the forebody. An example is provided which involves modifying the pressure distribution along a given meridian line of the forebody.

N81-26116/6 PC **A04**/MF **A01**
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
Flap-Lag-Torsional Dynamic Modelling of Rotor Blades in Hover and in Forward Flight, Including the Effect of Cubic Nonlinearities.
M. R. M. Crespodasilva. Jul 81, 73p NASA-CR-166194, ASD-81-6-1
Contract NAG2-38

The differential equations of motion, and boundary conditions, describing the flap-lead/lag-torsional motion of a flexible rotor blade with a precone angle and a variable pitch angle, which incorporates a pretwist, are derived via Hamilton's principle. The meaning of inextensionality is discussed. The equations are reduced to a set of three integro partial differential equations by elimination of the extension variable. The generalized aerodynamic forces are modelled using Greenberg's extension of Theodorsen's strip theory. The equations of motion are systematically expanded into polynomial nonlinearities with the objective of retaining all terms up to third degree. The blade is modeled as a long, slender, of isotropic Hookean materials. Offsets from the blade's elastic axis through its shear center and the axes for the mass, area and aerodynamic centers, radial nonuniformaties of the blade's stiffnesses and cross section properties are considered and the effect of warp of the cross section is included in the formulation.

N81-26144/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Subsonic Tests of an All-Flush-Pressure-Orifice Air Data System.
T. J. Larson, and P. M. Siemers, III. Jun 81, 50p NASA-TP-1871, H-1122
Presented at the 1980 Air Data Systems Conf., Colorado Springs, May 1980.

The use of an all-flush-pressure-orifice array as a subsonic air data system was evaluated in flight and wind tunnel tests. Two orifice configurations were investigated. Both used orifices arranged in a cruciform pattern on the airplane nose. One configuration also used orifices on the sides of the fuselage for a source of static pressure. The all-nose-orifice configuration was similar to the shuttle entry air data system (SEADS). The flight data were obtained with a KC-135A airplane. The wind tunnel data were acquired with a 0.035-scale model of the KC-135A airplane. With proper calibration, several orifices on the vertical centerline of the vehicle's nose were found to be satisfactory for the determination of total pressure and angle of attack. Angle of sideslip could be accurately determined from pressure measurements made on the horizontal centerline of the aircraft. Orifice pairs were also found that provided pressure ratio relationships suitable for the determination of Mach number. The accuracy that can be expected for the air data determined with SEADS during subsonic orbiter flight is indicated.

N81-26494/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Overview of Langley Activities in Active Controls Research.
I. Abel, and J. R. Newsom. Jun 81, 21p NASA-TM-83149
Presented at the Joint Automatic Control Conf., Charlottesville, MD., 18-19 Jun. 1981.

The application of active controls technology to reduce aeroelastic response of aircraft structures offers a potential for significant payoffs in terms of aerodynamic efficiency and weight savings. The activities of the Langley Research Center (laRC) in advancing active controls technology. Activities are categorized into the development of appropriate analysis tools, control law synthesis methodology, and experimental investigations aimed at verifying both analysis and synthesis methodology.

N81-26497/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Structures and Dynamics Division Research and Technology Plans, Fiscal Year, 1981.
K. S. Bales. Jun 81, 43p NASA-TM-83137

The objectives, expected results, approach, and FY 81 milestones for the Structures and Dynamics

Division's research program are presented. This information will be useful in program coordination with other government organizations in areas of mutual interest.

N81-26846/8 PC **A08**/MF **A01**
Wyle Labs., El Segundo, CA.
Static Tests of Excess Ground Attenuation at Wallops Flight Center.
Final Report.
L. C. Sutherland, and R. Brown. Jun 81, 155p
NASA-CR-3435, WR-80-32
Contract NAS1-15845

An extensive experimental measurement program which evaluated the attenuation of sound for close to horizontal propagation over the ground was designed to replicate, under static conditions, results of the flight measurements carried out earlier by NASA at the same site (Wallops Flight Center). The program consisted of a total of 41 measurement runs of attenuation, in excess of spreading and air absorption losses, for one third octave bands over a frequency range of 50 to 4000 Hz. Each run consisted of measurements at 10 locations up to 675 m, from a source located at nominal elevations of 2.5, or 10 m over either a grassy surface or an adjacent asphalt concrete runway surface. The tests provided a total of over 8100 measurements of attenuation under conditions of low wind speed averaging about 1 m/s and, for most of the tests, a slightly positive temperature gradient, averaging about 0.3 C/m from 1.2 to 7 m. The results of the measurements are expected to provide useful experimental background for the further development of prediction models of near grazing incidence sound propagation losses.

PAT-APPL-6-216 722 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Rotary Latch.
Patent Application,
Kenneth W. Rosenberg. Filed 15 Dec 80, 8p AD-D008 544/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention describes a rotary latch having drive mean rotatably mounted in a housing, said drive means having a semi-circular hooked-shaped latch arm thereon. A cover is attached to said housing and an axially mounted, spring-biased shaft is concentrically mounted within said drive means and has locking lugs engageable with said drive means and said cover. In one axial position of said center shaft, said drive mean is locked against rotation and, in another axial position the drive means in unlocked and free to rotate. A stop is provided on said drive means and is engageable with said housing to limit rotation of latch arm.

PB81-870974 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aircraft Design; Technological Forecasting. January, 1972-July, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 132p
Supersedes PB80-815970.

Citations in this retrospective bibliography cover technological forecasting for civilian and military aircraft designs or configurations. Attention is also given to the forecasting of aircraft structures and various subsystems. Coverage is worldwide. (Contains 129 citations fully indexed and including a title list.)

1D. Aircraft Flight Control and Instrumentation

AD-A100 808/5 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Flight Control System Analysis and Design for a Remotely Piloted Vehicle with Thrust Vectoring Unit.
Master's thesis,
Brian Leigh Jones. Dec 80, 155p Rept no. AFIT/GAE/AA/80D-12

This study investigated the stability and control of a remotely piloted vehicle (RPV) with a thrust vectoring unit attached. All geometric and aerodynamic data was generated and used to analyze the RPV. Specific handling qualities were developed and compared with the RPV characteristics. This comparison indicated that the RPV was too oscillatory in both the phugoid and dutch roll modes. Also, the RPV displayed a dominant spiral mode. A flight control system was synthesized to eliminate these traits. Evaluation of this flight control system was conducted through the use of three different sensitivity studies and a nonlinear simulation. In addition, a model matching application was examined for this RPV. Model matching entails using design procedures to synthesize an expanded flight control system so that the RPV has dynamic characteristics similar to the F-15. (Author)

1E. Air Facilities

AD-A100 704/6 PC **A06**/MF **A01**
Federal Aviation Administration, Washington, DC. Associate Administrator for Airports.
Operations Under the Airport and Airway Development Act of 1970.
Rept. no. 11 (Annual) for period ending 30 Sep 80,
Virginia J. Martin. 1980, 122p Rept no. FAA-ARP-81-1
See also Rept. no. FAA-ARP-80-1, AD-A086 293.

Section 24 of the Airport and Airway Development Act of 1970 (P.L. 91-258) requires that the Secretary, Department of Transportation, submit an annual report to Congress of operations under Part II of the Act for the preceding fiscal year. This report covers operations for the fiscal year ending September 30, 1980. (Author)

2. AGRICULTURE

2B. Agricultural Economics

PB81-215121 PC **A06**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Sorghum - Millets - Peas: A Bibliography of the Indian Literature, 1969-1973.
P. S. Jadhav, T. C. Jain, and S. Prasannalakshmi. 1975, 124p

The literature specialization in International Crop Research Institute for the Semi-Arid Tropics Library primarily would be on all aspects of Sorghum, Millets, Chickpea, Pigeonpea, Farming Systems, Water Utilization, Soil Water Management and on problems relating to economic aspects of crop production in the Semi-Arid Tropics of the World.

PB81-218166 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. Natural Resource Economics Div.
Additions to Cropland, 1975-77: A Report on a Landownership Follow-On Survey.
Arthur B. Daugherty. May 81, 27p AGESS-810501

An estimated 9.1 million acres of land were converted to crop production by more than 220,000 landowners during the 1975-77 period. More than 60 percent of the new cropland was previously in pasture, grass, or rangeland. More than half the land had not been previously used for crop production. One third of the land was cleared of brush or trees prior to use as cropland. More than 85 percent of the owners indicated that about 85 percent of the land would continue in crop production in the future.

PB81-218737 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Price Spreads and Cost Components for Broilers and Eggs.
Staff rept.,
Kenneth Blase. Jan 81, 21p AGESS-810119

Price spreads for broilers and eggs remained relatively stable from 1960 through 1970, then rose steadily from 1970 to 1979. The cost of performing almost every marketing service increased from 1970 to 1979 with labor, energy, and packaging contributing heavily to the increased costs. Cost components were introduced in 1972 as another method of identifying the reasons for increasing marketing costs. Although marketing costs of broilers and eggs have increased, structual changes in the industry (almost complete integration for broilers and increasing integration for egg production) and the resulting efficiencies throughout the production and marketing system have held the increases to a minimum compared with other foods; thus, broilers and eggs have consistently been good buys.

PB81-218745 PC **A08**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
Agricultural Structures Policy in the European Economic Community.
Staff rept.,
Edmund Neville-Rolfe. May 81, 162p AGESS-810522

The study summarizes and discusses agricultural structural policies enacted by the European Economic Community, the application of Community measures in each member country, and the National measures of each member country. Although original intentions were to spend a large proportion of the EEC's agricultural budget on farm structure, cost escalations in commodity price support programs, storage costs, and surplus disposal schemes resulted in niggardly Community funding for agricultural structural improvements. While some member countries have a strong viable program of farm restructuring drawing on both national and Community funding (e.g., The Netherlands), others are at a much lower level of activity (e.g., Italy).

PB81-218786 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. Crop Reporting Board.
Rice Stocks: On and Off Farms, Final Estimates for 1975-79.
Jan 81, 13p SB-652

The bulletin presents the final 1975-79 estimates of rice stocks on and off farms for the six major producing States--Arkansas, California, Louisiana, Mississippi, Missouri, and Texas. Estimates for previous years are available in Statistical Bulletins Nos. 599 and 429.

PB81-219925 PC **A12**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
Farm Business Management and Credit Analysis: A Project in Managerial Problem Solving 28.621-.622.
Final rept.,
James D. Walker. May 81, 265p 132-80-VIII

The project is the development of a training and/or reference handbook that will aid Farmers Home Administration (FmHA) employees in supervising farm applicants and borrowers with management and credit decisions. The information presented is a collection of accepted and proven ideas that have been condensed, described and accumulated into one handbook. This project covers such topics as the uses and purposes of farm records, financial statements, the various types of farm analyses, farm budgeting, risk management, credit, methods to provide effective management assistance and finally forms FmHA presently uses

to analyze farming and ranching operations. Based on the research done, several recommendations have been made concerning the use of this handbook and various changes that need to be made to improve the quality of farm management and credit analyses that FmHA presently provides.

PB81-220055 PC **A03**/MF **A01**
Ohio State Univ., Columbus.
A Model of the Political Economy of Agricultural Credit: The Case of Bolivia.
Paper no. 19,
Jerry R. Ladman, and Ronald L. Tinnermeier.
Aug 79, 43p AID-PN-AAH-362
Contract AID/ta-BMA-7
International Conference on Rural Finance Research Issues (2nd), Calgary, Canada, August 29-31, 1979.

The document contends that although these programs are economically oriented, agricultural development programs in LDCs are used as an instrument for consolidating political support. A model of the political economy of agricultural credit is examined and applied to Bolivia. Conclusions and policy implications are then drawn. The model demonstrates that under typical LDC conditions of direct government control of financial institutions, concessionary interest rates, defaulting, and inflation, credit is used for both economic and political reasons.

PB81-220287 PC **A05**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
Prospects for U.S. Agricultural Exports to Eastern Europe Through 1985.
Staff rept.,
Edward Cook. May 81, 83p AGESS-810529

Following rapid expansion of U.S. agricultural exports to Eastern Europe during the seventies, the prospects for continued growth of these exports are examined for the coming 5 years. Because of their overriding share of U.S. agricultural exports to the region, analysis is limited to grains, oilseeds, and oilseed meal. Results indicate a stagnation in U.S. agricultural exports to the region recline in East European grain imports from their 1979/80 peak.

PB81-220642 PC **A03**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Some Dimensions of Traditional Farming in Semi-Arid Tropical India.
Progress rept.,
N. S. Jodha. Sep 79, 35p AID-PN-AAH-423
Grant AID/ta-G-1421

This paper discusses some aspects of traditional farming systems in SAT areas of peninsular India. Results which are of direct relevance to the research strategy for generating new technology for SAT areas are discussed. This paper analyzes the rationale behind the practices of monsoon fallowing of deep Vertisols and intercropping in rainfed agriculture.

PB81-220683 PC **A03**/MF **A01**
Ohio State Univ., Columbus.
The Impact of Rural Credit on Production and Income Distribution.
Paper no. 18,
J. Sayad. Aug 79, 35p AID-PN-AAH-361
Grant AID/ta-BMA-7
Prepared for International Conference on Rural Finance Research Issues (2nd), Cagary, Canada, August 29-31, 1979.

Many LDCs have used rural credit as an incentive to promote investments in their agricultural sectors. Using examples from Brazil, this paper analyzes the effectiveness of these policies and their impact on income distribution. First, the institutional and economic environment of Brazil is outlined and then a model is presented through which rural credit is analyzed. Next, the impact of these credit programs on income distribution is discussed. Empirical evidence and a summary of results conclude this report.

PB81-221152 PC **A02**/MF **A01**
Minnesota Univ., St. Paul. Dept. of Agricultural and Applied Economics.
Institutional Factors Affecting the Adoption of Agricultural Sector Analysis Methodology in LDC's.
Staff paper,
H. Klein, and T. Roe. Jul 78, 22p P78-10, AID-PN-AAH-566
Contract AID/ta-BMA-5

Despite recent efforts to develop and apply agricultural sector analysis models in LDCs, data on the institutionalization of ASA techniques for policy making sectors remain lacking. The document discusses the issues and constraints regarding such institutionalization, as exemplified in the ASA model developed in Tunisia.

PB81-221590 PC **A06**/MF **A01**
Economic Research Service, Washington, DC. Foreign Demand and Competition Div.
Indices of Agricultural Production in Africa and the Near East 1956-75.
Jul 76, 105p STATISTICAL BULL-556
See also report for 1970-79, PB80-198419.

Indices of total and per capita agricultural and food production for Africa and the Near East are presented for the base period 1961-65 and annually for 1956-75. Data for population, agricultural production, and aggregates of agricultural and food production are also included. Country indices are calculated by Laspeyres' base-weighted aggregate formula.

PB81-222101 PC **A11**/MF **A01**
Pacific Consultants, Washington, DC.
New Lands Productivity in Egypt: Technical and Economic Feasibility,
L. F. Hesser, and E. Asmon. Jan 80, 235p AID-PN-AAH-511
Contract AID/NE-C-1645

Egypt has made heavy public investments in land reclamation during the past 25 years. The economic and social pressures that undergrid the emphasis on expanding the cultivated area are real and understandable. This reports states that a number of land reclamation opportunities with potentially attractive rates of return do exist if proper criteria is followed. Priority should be given to rehabilitating already reclaimed lands in areas where the required water lift is low.

PB81-222119 PC **A16**/MF **A01**
Pacific Consultants, Washington, DC.
New Lands Productivity in Egypt: Technical and Economic Feasibility. Crop Budgets and Farm Plans.
Working paper no. 1.
Jan 80, 361p AID-PN-AAH-527
Contract AID/NE-C-1645

Land reclamation has recently captured the interest of government officials in Egypt. Most new lands reclamation is being accomplished in desert regions. This report contains nine working papers which relate detailed backgrounds and descriptions of previously performed feasibility studies. Topics which are included in these working papers are: (1) crop budgets and farm plans; (2) sociological considerations, Tahaddi: a case study; (3) credit and input supply system; (4) marketing system; (5) prices; (6) perspectives for fresh produce exports; (7) agricultural research; (8) comparison of benefits of different agricultural projects; and (9) making technology the variable. A 21-item bibliography (1976-79) and a comparison of benefits of agricultural products is appended.

PB81-223240 PC **A03**/MF **A01**
Economic Research Service, Washington, DC.
Major Statistical Series of the U. S. Department of Agriculture: How They Are Constructed and Used: Volume 5: Consumption and Utilization of Agricultural Products.
Apr 72, 46p AGRICULTURE/HB-365

Statistical data series which measure the supply and utilization of agricultural commodities are described and evaluated in this report. Each of the large number of data series measures some aspect of the stock and flow of agricultural commodities. Some relate to individual commodities and others are aggregate measures encompassing the entire complex of production and marketing activities. The basic data framework for all of this work is the set of supply-utilization balance sheets for individual commodities and approximately homogeneous groups of commodities.

2C. Agricultural Engineering

PB81-215147 PC **A03**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
The Braking of Agricultural Tractor/Trailer Combinations.
Technical rept.,
L. Barltop. Oct 79, 26p RV/2/79

It is in the interests of road users on public roads that all vehicles comply with minimum brake performance specifications. These specifications were formulated from comprehensive research into the capabilities of each individual type of vehicle. It is the object of this report to put forward recommendations for the minimum brake performance of agricultural tractor/trailer combinations. Results of various brake tests on vehicles with different braking systems and layouts will be examined in order to substantiate these recommendations. This investigation was undertaken to advise the Committee on Dimensions and Masses of Agricultural Equipment in formulating recommendations.

PB81-216061 PC **A06**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Evaluation and Improvement of Border Irrigation,
Gideon Peri, Donald I. Norum, and Gaylord V. Skogerboe. Jul 79, 124p WATER MANAGEMENT-TR-49C, AID-PN-AAH-590
Grant AID/ta-C-1411

Border irrigation is a method of controlled surface flooding involving a rectangular field bounded by dikes along its longer dimension to restrict the lateral flow of water. This report is concerned with the evaluation and improvement of the graded border type in which there is a gentle and uniform slope in the direction of irrigation. Several different models are described, as are the processes for applying them.

PB81-217408 CP **T05**
Bureau of Reclamation, Denver, CO.
Irrigation Water Management and Conservation Program (MINI-80).
Software,
L. Albert Brower. Feb 81, mag tape DOI/DF-81/003
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-217416.

The programs use climate, soil, crop, and distribution system paramaters to develop an optimum schedule for the timing and application of irrigation water, and for accounting water demands thoughout the distribution system. Input data also includes soil moisture status acquired from various types of measuring devices including the neutron probe. Programs are included for scheduling the water requirements on total irrigation projects...Software Description: The program is written in the FORTRAN programming language for implementatin on a CDC 74/28 computer using the NOS operating system. 50K bytes of core storage are required to operate the model.

PB81-217416 PC **A06**/MF **A01**
Bureau of Reclamation, Denver, CO.
User's Guide for Irrigation Water Management and Conservation Program (MINI-80). Revision 3.
12 Feb 81, mag tape DOI/DF-81/003A
For system on magnetic tape, see PB81-217408.

The programs use climate, soil, crop, and distribution system parameters to develop an optimum schedule for the timing and application of irrigation water, and for accounting water demands throughout the distribution system. Input data also includes soil moisture status acquired from various types of measuring devices including the neutron probe. Programs are included for scheduling the water requirements on total irrigation projects.

PB81-218299 PC **A03**/MF **A01**
Montana Water Resources Research Center, Bozeman.
Assessment of Methodology Required to Quantify Irrigation Return Flows.
Final rept.,
Michael E. Nicklin, and Richard L. Brustkern. Mar 81, 30p MWRRC-114, W81-03724, OWRT-A-120-MONT (1)
Contract DI-14-34-0001-9028
Prepared in cooperation with Montana State Univ., Bozeman. Dept. of Civil Engineering and Engineering Mechanics.

Good water management requires that all available water in a stream-aquifer system be properly accounted for. In the semiarid West the major water demand is for agricultural irrigation. Significant portions of diverted irrigation water return to the stream. The amount and timing of irrigation return flow is difficult to quantify. The study's goals were (1) to identify the existing methodologies for return flow quantification, and (2) to suggest potential field sites that might be appropriate for field testing of the more promising methodologies.

PB81-218596 PC **A10**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Organizational Problems and Their Consequences on Improved Watercourses in Punjab,
Ashfaq Hussain Mirza, and Douglas James Merrey. Dec 79, 209p WATER MANAGEMENT-TR-55, AID-PN-AAH-592
Grant AID/ta-C-1411

Based on an intensive survey of ten improved watercourses in Punjab, this study shows the inadequacy of present forms of social organization of watercourses for insuring their adequate maintenance. Using as the major criterion the quality of maintenance of improved watercourses, the study suggests the following sociological characteristics as conducive to good maintenance under present conditions: a large percentage of landholdings in the 6.5 to 25 acre range; relatively equal distribution of power and influence among farmers on the watercourse; a large percentage of farmers being perceived as having some power and influence.

PB81-218612 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Irrigation and Honor: Cultural Impediments to the Improvement of Local Level Water Management in Punjab, Pakistan.
Water management technical rept. no. 53,
Douglas J. Merrey. 1979, 64p AID-PN-AAH-591
Contract AID/ta-C-1411
Prepared in cooperation with Arizona Univ. Tucson; California Univ. at Davis; Utah State Univ., Logan; New Mexico State Univ., Las Cruces, and Oregon State Univ., Corvallis.

Inadequate organization of irrigation water users is recognized as the major constraint to improving on-farm water management in Pakistan. Previous studies carried out by Colorado State University and Pakistani sociologists have identified characteristics of local social organizations that either inhibit or facilitate the introduction of programs for watercourse reconstruction and maintenance. This report based on a detailed study of one village, including observations of a watercourse reconstruction project, supplements previous studies by describing a major theme in Punjabi culture, the concept of izzat.

PB81-223620 PC **A10**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Evaluation and Improvement of Basin Irrigation.
Technical rept.,
Gideon Peri, Gaylord V. Skogerboe, and Donald I. Norum. Jun 79, 202p WATER MANAGEMENT-TR-49B, AID-PN-AAH-589
Contract AID/ta-C-1411

A comprehensive definition and description of basin irrigation is given. A procedure is outlined for the design and evaluation of basin irrigation systems, showing the interactions between the various basin characteristics, the operational parameters, the management parameters, and the performance parameters. A general model is discussed by considering the various functions upon which it must be based (infiltration, advance, recession). A simple model for the determination of the infiltrated water distribution under basin irrigation is also presented.

PB81-223638 PC **A06**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Evaluation and Improvement of Irrigation Systems.
Technical rept.,
Gideon Peri, and Gaylord V. Skogerboe. May 79, 102p WATER MANAGEMENT-TR-49A, AID-PN-AAH-588
Contract AID/ta-C-1411

A comprehensive procedure for the evaluation and improvement of irrigation systems is suggested. The procedure is based on the analysis of the performances of the system for an individual application, along with the irrigation management regime(intervals and depths of application), resulting in an analysis for the whole irrigation season. The irrigation system is quantified by four parameters: distribution uniformity and delivery, deep-percolation and storage efficiencies. The irrigation management and irrigation regime are quantified by ratios of recommended and determined intervals and depths for the individual application.

2D. Agronomy and Horticulture

PB81-214397 PC **A07**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Crops of the West African Semi-Arid Tropics,
A. H. Kassam. Oct 76, 150p

This review deals with three aspects, i.e., ecology, cultivation, and diseases and pests, of 23 crops which are grown in the West African Semi-Arid Tropics. These crops form six groups: cereals, legumes, roots and tubers, vegetables, fibers, and other crops.

PB81-214405 PC **A07**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Proceedings of the Consultants' Group Meetings on Downy Mildew and Ergot of Pearl Millet Held at Hyderabad, India on 1-3 October 1975,
R. J. Williams. 1 Oct 75, 139p

ICRISAT, the International Crops Research Institute for the Semi-Arid Tropics, was created to serve a large segment of humanity which has been left behind in modern advances in the sciences of agricultural production. Pearl millet is the major crop able to withstand the moisture stresses so common on the sandier and less moisture retentive soils and of the drier areas of the semi-arid tropics. But their susceptibility to downy mildew and ergot, when they are grown on an extensive scale, have proven to be the major obstacle to the realization of the high hopes aroused by these more productive genotypes. The report describes the problem and progress on this vital problem.

PB81-214413 PC **A03**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
Pearl Millet Anatomy.
Information bulletin no. 6,
R. K. Maiti, and S. S. Bisen. 1979, 27p
Errata sheet inserted.

The literature on pearl millet (Pennisetum americanum Pennisetum typhoides) anatomy is limited. It is scattered in a variety of studies, most of which lack adequate illustration. Only two general descriptions are known to the authors. The present study is an attempt to present a complete simplified illustrated description of the anatomy of pearl millet.

PB81-214439 PC **A09**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
The Eleusines (A Review of the World Literature),
Kenneth O. Rachie, and LeRoy V. Peters. 1977, 189p

While the Eleusines are practically unknown outside of Asia and Africa, they have had a definite place in the planning and research of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), since it started operations in July 1972. ICRISAT's interest is principally Eleusine coracana. First, finger millet plays an important part in the nutrition of millions of people in the semi-arid tropics, particularly in India and East Africa. Secondly, it is one of the hardiest crops grown in this region.

PB81-214454 PC **A08**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
Proceedings of the Consultants' Group Discussion on the Resistance to Soil-Borne Diseases of Legumes Held at Patancheru, India on 8-11 January 1979,
Y. L. Nene, J. Kannaiyan, M. P. Haware, M. V. Reddy, and G. S. Purss. 8 Jan 79, 161p

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has a mandate to improve three legumes--pigeonpea, chickpea, and groundnut--in the semi-arid tropical regions of Asia, Africa, and Central and South America. These legumes, like others, are affected by diseases; and those diseases caused by soil-borne pathogens are widespread and devastating. In order to review the present knowledge of some of the major diseases of pigeonpea and chickpea, with special emphasis on disease resistance, and to develop recommendations for research priorities leading to better disease control, ten leading scientists from several countries were invited for an in-depth discussion with ICRISAT staff in early 1979. The report discussed this research.

PB81-214462 PC **A04**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
An Annotated Bibliography of Chickpea Diseases, 1915-1976.
Information bulletin no. 1,
Y. L. Nene, A. Mengistu, J. B. Sinclair, and D. J. Royse. 1978, 52p

Chickpea (Cicer arietinum) is a native Asian plant species grown as a pulse crop throughout tropical and subtropical Asia, northern Africa, southern Europe, Central America, and the southern United States. Its seeds are used directly as food, ground into flour, or used as ingredients in curries, soups, and salads. Gram, garbanzo bean, and Spanish pea are other names for the crop. ICRISAT, an international agricultural research institute established in India, has a world-wide mandate for chickpea improvement. It is pleased to be associated with this publication on chickpea diseases. The authors have worked together in an international effort to produce a bibliography annotating all the known literature on the diseases of the crop.

PB81-214488 PC **A15**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
International Workshop on Grain Legumes Held at Hyderabad, India on January 13-16, 1975.
13 Jan 75, 333p

The report contains papers from the first International Workshop on Grain Legumes organized by International Crops Research Institute for the Semi-Arid Tropics. ICRISAT has a worldwide responsibility for research on the two grain legumes--pigeonpeas and chickpeas--which occupy

the most important position in the diet of the people living in the semi-arid tropics.

PB81-215097 PC **A12**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
A Guide to Sorghum Breeding,
Leland R. House. 1980, 253p

Contents:
The sorghum plant:
Its basic uses, characteristics, and distribution;
The sorghum plant:
Growth stages and morphology;
Genetics;
Sorghum improvements:
Methods and procedures;
The seed industry:
Role, organization, and development.

PB81-215105 PC **A04**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Indian Theses on Groundnut: A Bibliography, 1948-1977.
Information bulletin no. 4,
Shree Ram Yadav, S. Prasannalakshmi, and P. S. Jadhav. 1978, 54p

Groundnuts, as a food crop, contribute significantly to human diets in the Semi-Arid Tropics. World production of groundnuts is estimated to be an annual 18.5 million metric tons grown on an area of 19.3 million hectares (an average yield of 958 kg/ha in shell). More than 70 percent of the world production is grown in developing countries, and India produces more than 5 million metric tons from 7 million hectares. This bibliography is a compilation of M Sc and Ph D theses on groundnuts submitted to Indian universities and institutions prior to 1977.

PB81-215139 PC **A11**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Bibliography of Theses on ICRISAT Specialities,
Shree Ram Yadav, S. Prasannalakshmi, and T. C. Jain. 1977, 229p
Theses Submitted to Indian Universities till 1975 on Sorghum, Millets, Chickpea, Pigeonpea, Groundnut, Farming Systems, Soils, Water Management, and Agricultural Climatology.

The International Crops Research Institute for the Semi-Arid Tropics is a world center for crop improvement research on sorghum, pearl millet, pigeonpea, chickpea and groundnut. Research in farming systems, resource utilization and economics are equally important activities of the Institute. This bibliography of literature on all these important areas of research is urgent and vital for the success of ICRISAT's research programs.

PB81-215642 PC **A07**/MF **A01**
Colorado Water Resources Research Inst., Fort Collins.
Urban Lawn Irrigation and Management Practices for Water Saving with Minimum Effect on Lawn Quality.
Completion rept.,
Robert E. Danielson, Charles M. Feldhake, and William E. Hart. Apr 81, 130p COMPLETION-106, W81-03604, OWRT-A-043-COLO(2)
Contracts DI-14-34-0001-9006, DI-14-34-0001-0106

Understanding the response of turfgrass to water and energy is critical in semiarid regions where energy for evaporation is high and water is often in short supply. During the summers of 1979 and 1980 research was conducted at Colorado State University to help in planning efficient urban lawn irrigation techniques. Forty-eight small bucket-type weighing lysimeters were used to measure the effect of various management practices on maximum water use and the response of turf quality to limited irrigation levels. Maximum water use was influenced by mowing height, nitrogen fertility, shade level, grass specie, and to a slight degree, soil properties. Nitrogen-deficient grass showed a linear decrese in visual auality with decrease in irrigation; adequately fertilized grass, however, had minimal reduction in quality when irrigation was decreased.

PB81-216541 PC **A11**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Chickpea Bibliography, 1930 to 1974,
K. B. Singh, and L. J. G. Van Der Maesen. 1977, 229p

With an increased emphasis on research on the important grain legume crop of chickpea, there is a need for a comprehensive listing of chickpea literature. This effort was undertaken to update the available bibliographic works and to provide wider coverage of the world literature. This bibliography covers the years 1930-1974. Also included is all traceable literature prior to this period.

PB81-216558 PC **A03**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
International Chickpea Newsletter, Number 1, December 1979.
Dec 79, 37p

Contents:
Genetic resousrces;
Breeding;
Physiology/Agronomy;
Pathology;
Entomology, Microbiology, Grain quality and Biochemistry.

PB81-216962 PC **A24**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
International Workshop on Farming Systems Held at Hyderabad, India on November 18-21, 1974,
R. W. Cummings, J. S. Kanwar, J. Kampen, D. Rijks, and A. Krishnan. 18 Nov 74, 557p

Major subject headings of the Workshop are the following: Resource assessment and utilization of research for farming systems - land, water, climate, man; Crops and cropping patterns; Socio-Economic research in farming systems; Transfer of technology and off-site research.

PB81-218620 PC **A02**/MF **A01**
Minnesota Univ., St. Paul. Dept. of Agricultural and Applied Economics.
Subjective Production Function Parameters and Risk: Wheat Production in Tunisia.
Staff paper,
Terry Roe, and David Nygaard. Dec 79, 17p P79-43, AID-PN-AAH-565
Contract AID/ta-BMA-5

It is maintained that, at the time of seed bed preparation for the production of durum wheat, Tunisian farmers form subjective estimates of the parameters of the underlying production function. If their estimates are not accurate, resources are not optimally allocated. If farmers behave as though their estimates are not known with certainty, they face risk. The problems become even more acute if these parameters vary in some complex manner, as in the case of wheat, with yearly weather, soil moisture, disease, and other soil and atmospheric conditions affecting plant growth. This paper explores these problems, by focusing on 125 farmers in Northern Tunisia during the 1976-77 crop year.

PB81-220238 PC **A03**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
Intercropping in Traditional Farming Systems,
N. S. Jodha. 1979, 27p AID-PN-AAH-424
Grant AID/ta-G-1421

Though largely neglected by researchers and planners, intercropping is a key element of traditional farming systems. its superiority over sole cropping has been shown in terms of higher and dependable gross returns per hectare as well as per unit of peak period labor use. Its potential for greater employment is also revealed. Studies show that intercropping is largely a system of small and unirrigated farms.

PB81-220279 PC **A04**/MF **A01**
Economics and Statistics Service, Washington, DC. Statistical Research Div.
One, Two, and Three Line Segment 'Straw Man' Models: Soybean Yields in Iowa, Illinois, and Indiana.
Staff rept.,
Jeanne L. Sebaugh. May 81, 66p AGESS-810514

All of the straw man models attempt to explain differences in yields over time by fitting trend lines to the yield data. The one line segment straw man model, simple linear regression, describes a uniform increase in yields over time. The two and three line segment straw man models allow the rate of change in yields to vary over the time period. The performance of the three models in predicting soybean yields in Iowa, Illinois, and Indiana is compared based on eight model characteristics.

PB81-220600 PC **A02**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
The Processes of Desertification and the Choice of Intervention.
Progress rept. no. 2,
N. S. Jodha. Jun 79, 21p AID-PN-AAH-422
Grant AID/ta-G-1421

The arid zone of Rajasthan currently accounts for nearly 63% of the tropical arid areas in India, and is expanding. The deliberations of the UN Desertification Conference at Nairobi (1977) and subsequent follow-up actions at national and international levels clearly indicate the increasing concern about the problem. Viable solutions call for understanding of the cause manifested by the decisions and practices of the ultimate users of the land in the arid or desert areas. This paper examines the process of desertification in the arid zone of Rajasthan.

PB81-220766 PC **A08**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
An Annotated Bibliography of Chickpea Diseases 1915-1976,
Y. L. Nene, A. Mengistu, J. B. Sinclair, and D. J. Royse. 1978, 152p AID-PN-AAH-585
Grant AID/ta-G-1499

Chickpea (Cicer arietinum) is a native Asian plant species grown as a pulse crop throughout tropical and subtropical Asia, northern Africa, southern Europe, Central America, and the southern U. S. Its seeds are used directly as food, ground into flour, or used as ingredients in curries, soups, and salads. Gram, garbanzo bean, and Spanish pea are other names for the crop. ICRISAT, an international agricultural research institute established in India, has a world-wide mandate for chickpea improvement. It is pleased to be associated with this publication on chickpea diseases.

2E. Animal Husbandry

PB81-211815 PC **A06**/MF **A01**
International Livestock Centre for Africa, Addis Ababa (Ethiopia).
Evaluation of the Productivities of Maure and Peul Cattle Breeds at the Sahelian Station, Niono, Mali.
1978, 117p ILCA/MONO-1, AID-PN-AAG-756
Grant AID/ta-G-1497

From 1966 to 1975, the Sahelian Station at Niono, Mali, maintained substantial herds of two typical African breeds of Zebu cattle, the Maure and the Peul, together with their crosses, in order to collect comparative data in the areas noted below. This report is an analysis of these data performed by the International Livestock Center for Africa. The animals were kept for milk and meat production and for draft purposes. They were maintained by improved management practices such as supplementary feeding, controlled breeding, and veterinary care. An introduction describes the animal production system at Niono, together with the preparation of the data for analysis and the analytical method used. Appended is a 40-item bibliography of English, French, and German language report-related titles (1947-76).

PB81-221137 PC **A09**/MF **A01**
International Livestock Centre for Africa, Addis Ababa (Ethiopia).
Livestock Production in the Subhumid Zone of West Africa: A Regional Review.
1979, 191p ILCA/SYSTEMS STUDY-2, AID-PN-AAH-564
Grant AID-DSAN-G-0081

This report on livestock production in the subhumid zone of West Africa is based on the results of a symposium held in Kaduna, Nigeria in March 1979, co-sponsored by the International Livestock Centre for Africa and the National Animal Production Research Institute. A definition of the zone is given, followed by a brief description of the environment and the Fulani pastoralists who own most of the livestock. The fodder and animal resources of the zone are then described, followed by section on tsetse-transmitted trypanosomiasis and other animal diseases, and concluding with an analysis of land-use and development strategies.

PB81-221418 PC **A06**/MF **A01**
International Livestock Centre for Africa, Addis Ababa (Ethiopia).
Small Ruminant Production in the Humid Tropics.
1979, 125p ILCA/SYSTEMS STUDY-3, AID-PN-AAH-563
Contract AID-DSAN-C-0081

Research is reviewed in the report on sheep and goat production in the humid zone of West Africa, including production parameters of the West African Dwarf breeds, feeding strategies based on natural and improved pastures and locally available agro-industrial byproducts, and the incidence of disease, particularly peste de petits ruminants and helminthiasis. The economics of small-farm and large-scale commercial production are discussed.

2F. Forestry

DE81024413 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Inventory of United States Forest Growth Models.
J. L. Trimble, and C. R. Shriner. Jun 81, 137p
ORNL/Sub-80/13819/1
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

This document is an inventory of forest tree growth models that have been developed in the United States. The intent of this inventory is to provide documentation of existing growth models and to present the state-of-the-art in forest growth modeling. Analysis of the accuracy or usefulness of the models does not fall into the scope of this document. The growth models discussed are organized into the following categories: individual tree models; gap models; whole stand or forest models; diameter distribution models; and unclassified models. The information provided for each model includes a general description, geographic coverage, and general application(s). Additional information including availability, computer execution, documentation, and an abstract (when available) is provided to further describe the model. A contact person knowledgeable in the use and development of each model is provided. This inventory focuses on computerized models; however, mathematical models and yield tables are discussed. (ERA citation 06:023283)

PB81-214777 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Large-Scale Color Aerial Photography as a Tool in Sampling for Mortality Rates.
Forest Service research paper.
David A. Hamilton. Jan 81, 14p FSRP/INT-269

Mortality rates specify the proportion of trees with a given set of characteristics that are expected to die in a fixed time interval. Results indicate that 1-year mortality trees can be dated and species can be assigned to green trees and to 1-year mortality trees with acceptable accuracy on 70 mm color photography at scales of 1:1600 and 1:2400. Attempts to date 2-year mortality trees on either scale photography were unsuccessful.

PB81-215485 PC **A03**/MF **A01**
Southeastern Forest Experiment Station, Asheville, NC.
Southern Pulpwood Production.
Forest Service resource bull.,
Thomas R. Bellamy, and Cecil C. Hutchins. Apr 81, 28p FSRB-SE-57, SEFES-81-13

Pulpwood production in the South rose a modest 7 percent in 1979 to 54 million cords. Of the increase, 55 percent was from roundwood and 45 percent was from plant byproducts. Pulping capacity of the 115 mills in the South also rose 7 percent to over 110,000 tons per day.

PB81-215493 PC **A06**/MF **A01**
Southeastern Forest Experiment Station, Asheville, NC.
Proceedings--Streams Workshop,
J. Gerald Eller, Clif Amundsen, Christine Eason, Don D. Tarbet, and Jimmy D. Gregory. Nov 79, 125p SEFES-81-12

This proceedings is the result of a Streams Workshop sponsored by the Southern Appalachian Research/Resource Management Cooperative (SARRMC). The purpose of SARRMC is to provide coordinated research, extension and educational support of programs to achieve full benefit of Appalachian forests, wildlands, and their associated resources for their natural, commercial, economic, and recreational utilization. The workshop addresses Cold Water Fisheries, Stream Recreation, and Non-point Source Pollution.

PB81-216160 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
White-pine Weevil Attack: Susceptibility of Western White Pine in the Northeast.
Forest Service research paper (Final),
Ronald C. Wilkinson. 1981, 8p NEFES/81-256, FSRP-NE-483

White-pine weevils killed the leaders of western white pines only 13 percent as frequently as they killed the leaders of eastern white pine in the same 10-year-old test plantation. Eastern white pine was the taller of the two species, for four families of western white pine of low to moderate susceptibility to weevil attack were almost as tall or taller than eastern white pine.

PB81-216418 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Guidelines for the Use of GYPCHEK to Control the Gypsy Moth.
Forest Service research paper (Final),
Franklin B. Lewis, Michael L. McManus, and Noel F. Schneeberger. 1979, 13p NEFES/81-257, FSRP-NE-441

This paper presents positive and negative attributes of GYPCHEK for evaluation by land managers contemplating gypsy moth control. Special precautions and procedures are outlined; environmental and ecological considerations are discussed; and results to be expected from the use GYPCHEK in gypsy moth control are presented.

PB81-217085 PC **A04**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Primary Forest Products Industry and Timber Use, Michigan, 1977.
Final rept.,
James E. Blyth, Jack Zollner, and W. Brad Smith. Jun 81, 60p FSRB-NC-55
See also PB-241427.

This report discusses recent Michigan forest industry trends, timber removals for industrial roundwood in 1977, and production and receipts of pulpwood, saw logs, and other industrial roundwood products. It reports on associated logging and primary mill residues and the disposition of mill residue.

PB81-217770 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Estimating Plant Biomass for Undergrowth Species of Northeastern Minnesota.
Forest Service general technical rept. (Final),
Lewis F. Ohmann, David F. Grigal, and Lynn L. Rogers. Jun 81, 15p FSGTR-NC-61

Biomass prediction equations were developed for some common ground cover plants from forest communities of northeastern Minnesota. The allometric function was used to predict biomass (dry weight) with ocular estimates of percent ground cover of the plant as the independent variable.

PB81-217788 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Estimating Northern Red Oak Crown Component Weights in the Northeastern United States.
Forest Service research paper (Final),
Robert M. Loomis, and Richard W. Blank. Jun 81, 13p FSRP-NC-194

Equations are described for estimating crown weights for northern red oak trees. These estimates are for foliage and branchwood weights. Branchwood (wood plus bark) amounts are subdivided by living and dead material into four size groups. Applicability of the equations to other species is examined.

PB81-217796 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
The Effect of Initial Number of Trees per Acre and Thinning Densities on Timber Yields from Red Pine Plantations in the Lake States.
Forest Service research paper (Final),
Allen L. Lundgren. Jun 81, 30p FSRP-NC-193

The report describes an analysis of initial density and subsequent thinning options for red pine (Pinus resinosa) plantations in the Lake States. Results showed that the initial number of established trees per acre has a major impact on the amount and quality of timber product yields, with 200 trees per acre (500/ha) thinned to 120 square feet of basal area per acre (27.5 sq m/ha) maximizing board-foot volume yields.

PB81-217820 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Growth Response of Speckled Adler and Willow to Depth of Flooding.
Forest Service research paper (Final),
M. Dean Knighton. Jun 81, 10p FSRP-NC-198

Growth and survival of speckled alder and willow were determined for two growing seasons with continuous flooding at different depths. Growth was at least four times greater when the water table was below the root crown than when it was 15 cm above. Mortality increased with flooding depth and was greatest for alder.

PB81-218075 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
The Timber Industries of Ohio.
Forest Service research bull. (Final),
James T. Bones, and Robert B. Redett. 1976, 32p NEFES/81-259, FSRB-NE-40
Color illustrations reproduced in black and white.

The results of a complete survey of the timber industries in Ohio, including statistics about industrial roundwood production and receipts, and production and disposition of the manufacturing residues that result. Comparisons are made with the most recent previous surveys, and trends in industrial wood output are noted.

PB81-218125 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Stem Breakage Effect on Cone and Pollen Production in Pinus Monticola (Dougl.).
Forest Service research note,

D. O. Coffen, and M. A. Bordelon. May 81, 8p FSRN/INT-312

Two studies in a western white pine blister rust resistance breeding arboretum/seed orchard examined the effect of stem breakage on cone and pollen production. Research was based on 4 years of data from 1,529 trees 15 to 29 years of age. Cone and pollen production were increased by breakage of the main stem in the upper crown. Top pruning may be a viable technique for stimulating flowering inseed orchards of western white pine.

PB81-218158 PC **A07**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Proceedings of Minnesota Forest Resource Inventory Conferences.
Forest Service general technical rept. (Final). Jun 81, 127p FSGTR-NC-64

The report contains 16 papers presented at the 1980 Minnesota Forest Resource Inventory Conferences.

PB81-218174 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Biomass of Singleleaf Pinyon and Utah Juniper.
Forest Service research paper,
Elwood L. Miller, Richard O. Meeuwig, and Jerry D. Budy. Apr 81, 23p FSRP/INT-273

Biomass determinations in singleleaf pinyon (Pinus monophylla) - Utah juniper (Juniperus osterosperma) stands in Nevada indicate that stem diameter and average crown diameter are the tree measurements most highly correlated with ovendry weights. The equations and tables developed provide a means for estimating the total aboveground biomass as well as the weights for the various size fractions by species. The tables can also be used to estimate the cordwood and slash resulting from fuelwood harvesting operations.

PB81-218190 PC **A03**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Modeling Seasonal Abundance of Douglas-Fir Beetle in Relation to Entomophagous Insects and Location in Trees.
General technical rept.,
Michael A. Marsden, Malcolm M. Furniss, and LeRoy N. Kline. Apr 81, 26p FSGTR/INT-111

Regression models were developed to predict abundance of Douglas-fir beetles in relation to entomophagous species, date, and sample characteristics. Probability of presence of entomophagous insects on samples was determined with the logistic function. Predation and parasitism were estimated to have caused 58 percent mortality of progeny during the summer.

PB81-218216 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
An Economic and Energy Analysis of Poplar Intensive Cultures in the Lake States.
Forest Service research paper (Final),
Dietmar Rose, Karen Ferguson, David C. Lothner, and J. Zavitkovski. Jun 81, 48p FSRP-NC-196

Short-(5 to 10 years) and long-(15 years) rotation, irrigated and nonirrigated intensive cultures of hybrid poplar were analyzed economically via cash flow analysis. Energy balances were also calculated for each alternative. Nonirrigated systems offer reasonable economic returns whereas irrigated systems do not. All systems produce more energy than they use as production inputs.

PB81-218224 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Effects of Prescribed Fire on Soil Nitrogen Levels in a Cutover Douglas-Fir/ Western Larch Forest.
Forest Service research paper,
Martin F. Jurgensen, Alan E. Harvey, and Michael J. Larsen. May 81, 10p FSRP/INT-275

The study reports 6 percent of total nitrogen lost and changes in other related soil properties after a clearcut and broadcast burn. The most persistent change (4 years) was a reduction in soil acidity. Forest management implications are discussed.

PB81-218232 PC **A03**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Forest Vegetation Removal and Slope Stability in the Idaho Batholith.
Forest Service research paper,
Donald H. Gray, and Walter F. Magahan. May 81, 28p FSRP/INT-271

The study gives results of field studies and supporting theoretical analyses show that forest vegetation often provides a significant margin of safety to the stability of slopes in the Idaho batholith. Woody vegetation contributes to the stability of these slopes by root reinforcement, by soil moisture depletion from interception and transpiration, by regulation of snow accumulation and melting, and by soil arching restraint between tree stems. Removal of vegetation by logging or fire can increase landslide risks at many locations.

PB81-218307 PC **A06**/MF **A01**
North Carolina Water Resources Research Inst., Raleigh.
Nitrogen Cycling and Assimilative Capacity of Nitrogen and Phosphorus by Riverine Wetland Forests,
Mark M. Brinson, H. David Bradshaw, and Emilie S. Kane. May 81, 108p UNC-WRRI-81-167, W81-03725, OWRT-B-114-NC(2)
Contract DI-14-34-001-8107
Prepared in cooperation with East Carolina Univ., Greenville, NC. Dept. of Biology.

Labeled (15N) nitrate and ammonium were added to swamp surface water and their diffusion to the forest floor was followed. Of the original nitrate added, 46% remained in the surface water of Tar Swamp and 62% in Creeping Swamp after 2 days. Two days after ammonium treatments, corresponding levels were 79% and 81%. As indicated by the absence of recoverable 15N in sediments following nitrate treatments, diffusion of labeled nitrate to the forest floor resulted in its transformation to N2O or N2 by denitrification. Available nitrogen reserves in the sediments were depleted through ammonification and nitrification during annual drydown episodes, and the capacity for additional nitrogen assimilation by the sediments was renewed. An experiment was then conducted to determine the capacity of sediments for sustained nutrient assimilation by adding nitrate, ammonium, phosphate, and secondarily treated sewage effluent to surface water in separate chambers at weekly intervals for 46 weeks.

PB81-218703 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
A Two-Plane Internally Irrigated Root Observation System for Forest Nursery Stock.
Forest Service research paper (Final),
Paul S. Johnson, Charles W. Putnam, and William G. Mares. Jun 81, 10p FSRP-NC-197

A root observation chamber designed for forest nursery stock is described in the report. The chamber consists of a lower root observation section and a detachable upper 'planter' section, both constructed of plexiglass and wood; the lower section is internally irrigated by a porous irrigation tube and the upper section by a 'leader tube.'

PB81-220253 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Water Requirements of Honeylocust (Gleditsia Triacanthos F. Inermis) in the Urban Forest.
Forest Service research paper (Final),
Howard G. Halverson, and Donald F. Potts. 1981, 10p NEFES/81-258, FSRP-NE-487

Honeylocust in the urban forest requires more water than the same tree growing on a homogeneous site. Water requirements averaged 1.55 times rural water requirements in the urban environment. Additional water demand was apparently due to advected energy.

PB81-221947 PC **A02**/MF **A01**
Southeastern Forest Experiment Station, Asheville, NC.
Evaluation of Veneer Yields and Grades from Yellow-Poplar, White Oak, and Sweetgum from the Southeast: COM-PLY Report-19.
Forest service research paper,
Robert H. McAlister. Apr 81, 16p FSRP-SE-220, SEFES-81-15
Sponsored in part by the Department of Housing and Urban Development, Washington, DC. Div. of Energy, Building Technology and Standards.

The dry volume yield and standard grades of veneer are given for yellow-poplar, sweetgum, and white oak by tree diameter and location within the stem. Manufacture of composite structural lumber and panels can effectively utilize available hardwood stands. The lower 26 feet of the stem of trees 16 inches d.b.h. and smaller yield a high proportion of grade C and better veneer that is desirable for COM-PLY lumber, while veneer of all grades can be used for the panels, and the particleboard cores can be made from both forest and mill residues. Although the total veneer yield from hardwoods is generally less than that from loblolly and slash pines, typical stands of mixed southern pine and hardwood timber yield.

3.
ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

AD-A100 705/3 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Precision Stellar Catalogs and the Role of Anomalous Refraction.
Semiannual rept. no. 1, Jun-Dec 77,
Douglas G. Currie. Jan 78, 21p
Contract N00014-77-C-0541

The current status of the University of Maryland program to evaluate the use of Two Color Refractometry (TCR) for the determination of precise stellar positions is discussed. Various aspects of the components of the program are considered in detail. The fabrication and operational progress with the hardware components is reviewed. A series of critical preliminary tests with TCR equipment operated on the 48-inch telescope have been conducted. The schedule for the various items of equipment which have been purchased and those which are being fabricated in-house is proceeding well. The technical and schedule aspects of several possible problem areas are discussed. A modification of the budget, which will have no cost or schedule impact, is being submitted separately to the Office of Naval Research to alleviate some of the above problems. (Author)

3B. Astrophysics

AD-A100 685/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Representations of Solar EUV Fluxes for Aeronomical Applications,
H. E. Hinteregger. 1981, 16p Rept no. AFGL-TR-81-0174
Pub. in Advanced Space Research, v1 p39-52 1981.

No abstract available.

AD-A100 866/3 PC **A03**/MF **A01**
Massachusetts Univ., Amherst.
A Study of Interstellar Carbonyl Sulfide.
Paul F. Goldsmith, and Richard A. Linke. 23 Sep 80, 40p
Contract N00014-76-C-0070, Grant NSF-GP-30424

We have carried out a study of the carbonyl sulfide (OCS) molecule in 24 interstellar and circumstellar molecular clouds, and detected it in a total of 10 sources and 7 different transitions. Analysis of the data using hydrogen densities derived from a study of CS (Linke and Goldsmith 1980), and assuming that the OCS lines are optically thin, yields a mean column density <N(OCS)> = 3 x 10 to the 14th power/sq cm in ten interstellar clouds while the average fractional abundance <N(OCS)/N(H2)> = 1.6 x 10 to the minus 9th power, consistent with the theoretical prediction of Oppenheimer and Dalgarno (1974). The results of maps and analysis of multiple transitions in several sources suggest that the regions responsible for the OCS emission are only marginally resolved with a beamsize of approx. 2'. Direct measurements yield (OCS/O13CS) = 21 and (OCS/OC34S) = 16 in SGR B2, compared to terrestrial values of 89 and 23, respectively. (Author)

AD-A100 902/6 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
M83. III. Age and Brightness of Young and Old Stellar Populations,
Eric B. Jensen, Raymond J. Talbot, Jr., and Reginald J. Dufour. 21 Mar 80, 26p Rept no. AFGL-TR-81-0179
Pub. in Astrophysical Jnl., v243 p716-735, 1 Feb 81.

No abstract available.

LA-UR-81-965 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Galactic Origin of Cosmic Rays I.
S. A. Colgate. 1981, 5p CONF-810711-1
Contract W-7405-ENG-36
17. international cosmic ray conference, Paris, France, 13 Jul 1981.

The theoretical basis for the supernova envelope shock origin of cosmic rays is reviewed. The theoretical explanation of the SN Type I light curve requires the ejection of a relativistic mass fraction. The criterion of the adiabatic deceleration by Alfven wave trapping neither applies in theory, when beta > 1, or practice, the Starfish high altitude nuclear explosion experiment. Arguments of delayed acceleration due to K-capture are not applicable to SN ejecta because a period of prompt recombination exists before subsequent stripping in propagation. (ERA citation 06:022739)

LA-UR-81-966 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Galactic Origin of Cosmic Rays II.
S. A. Colgate. 1981, 5p CONF-810711-2
Contract W-7405-ENG-36
17. international cosmic ray conference, Paris, France, 13 Jul 1981.

The CR acceleration due to shocks in the ISM depends upon multiple crossings approx. = c/3 v/ sub Alfven/ approx. = 10 exp 4 per e-fold energy gain. The up-stream scattering required to produce this barrier is Alfven wave turbulence. When the ratio (CR pressure)/(B exp 2 /8 pi) identical = beta > 1, the streaming velocity theoretically and observationally becomes >> v/sub Alfven/ and, hence, no effective up-stream barrier is likely to exist. If all ISM shock acceleration is limited to beta approx. << 1 and the average galactic CR conditions is beta approx. = 1, then shocks in the ISM are unlikely to supply the necessary acceleration. This is particularly so for high energy CR's accelerated early in the remnant history where beta must be large and the number of e-folds required are large. High energy CR's can be produced by the shock breaking out of the envelope into the magnetosphere of the SN star for E approx. > 10 exp 13 to 10 exp 14 eV. It is usually assumed that the energy dependent escape from the Galaxy E approx. > 10 exp 15 eV produces a steeper spectrum from 10 exp 15 to 10 exp 18 eV. Above this energy SN's in all galaxies fill the meta galaxy with CR's with a flatter slope. Conversely, an external source that attempts to fill the Galaxy from the outside must have a still steeper spectrum delta GAMMA approx. = -.75 to penetrate the diffusive barrier of our galaxy yet maintain the observed slope. This is unlikely since the energy density at 10 exp 15 eV in the meta galaxy would be between 10 exp -1 to 10 exp -2 of CR's in this galaxy or of the order of 10 exp 3 of the energy density of particles and fields in the IGM. (ERA citation 06:022740)

N81-26995/3 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
S201 Catalog of Far-Ultraviolet Objects.
T. Page, G. R. Carruthers, and H. M. Heckathorn. 1981, 151p NASA-TM-82376, NRL-8173
Prepared in Cooperation with NRL, Washington, D.C.

The results of analysis of the images of stars and other discrete objects obtained from the lunar based far ultraviolet camera/spectrograph (experiment S201) are presented. The brightnesses of all objects are placed on an absolute scale of UV magnitudes based on instrument preflight calibrations. These magnitudes are compared with expectations based on stellar model atmosphere flux distributions, and with those obtained from calibrated OAO-2 observations. The data reduction programs are also described.

N81-26996/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Distribution of Hot Stars and Hydrogen in the Large Magellanic Cloud.
T. Page, and G. R. Carruthers. 1981, 52p NASA-TM-82375
Contract NAS5-25481

Imagery of the Large Magellanic Cloud (LMC), in the wavelength ranges 1050 to 1600 A and 1250 to 1600 A, was obtained by the S201 far ultraviolet camera during the Apollo 16 mission. These images were reduced to absolute far-UV intensity distributions over the area of the LMC, with 3 to 5 arc min angular resolution. Comparison of these far-UV measurements in the LMC with H sub alpha and 21 cm surveys reveals that interstellar hydrogen in the LMC is often concentrated in 100 pc clouds within 500 pc clouds. Furthermore, at least 25 associations of O-B stars in the LMC are outside the interstellar hydrogen clouds; four of them appear to be on the far side. Far-UV and mid-UV spectra were obtained of stars in 12 of these associations, using the International Ultraviolet Explorer. Equivalent widths of L alpha and six other lines, and relative intensities of the continuum at seven wavelength from 1300 A to 2900 A, were measured. These spectra are also discussed.

N81-26998/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
PKS 2155-304 Relativistically Beamed Synchrotron Radiation from Bl Lac Object.
C. M. Urry, and R. F. Mushotzky. Mar 81, 32p NASA-TM-82101
Submitted for Publication.

The newly discovered BL Lacertae object, PKS 2155-304, was observed with the medium and high intensity energy detectors of the HEAO-1 A2 experiment. The variability by a factor of two in less than a day reported by Snyder, et al (1979) is confirmed. Two spectra, obtained a year apart, while the satellite was in scanning mode, are well fit by simple power laws with energy spectral index alpha sub 1 equals approximately 1.4. A third spectrum, of higher statistical quality, obtained while the satellite was pointed at its source, has has two components. An acceptable fit was obtained using a two power law model, with indices alpha sub 1 equals 2.0 (+1.2, -0.6) and alpha sub 2 equals -1.5 (+1.5, -2.3). An interpretation of the overall spectrum from radio through X-rays in terms of a synchrotron self-Compton model gives a good description of the data if allowance is made for relativistic beaming. Thus, from a consideration of the spectrum, combined with an estimate of the size of the source, the presence of jets is inferred without their observation.

N81-27006/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Cusp Region Particle Precipitation and Ion Convection for Northward Interplanetary Magnetic Field.
J. L. Burch, P. H. Reiff, R. W. Spiro, R. A. Heelis, and S. A. Fields. 1981, 12p NASA-TM-80763
Contract NGR-44-004-120

Data from Atmosphere Explorer D for periods of strong northward interplanetary magnetic field are discussed. In the dayside magnetospheric cusp region energy time spectrograms of suprathermal positive ion fluxes exhibit a characteristic 'V' pattern as the spacecraft moves toward higher latitudes; that is, with the peak in the energy spectrum falling in energy and then rising again. Convection velocities follow this pattern closely with strong eastwest flows (with antisunward components) occurring in the equatorward half of the 'V' and significant sunward flows occurring in the poleward half of the 'V'. These patterns can be understood qualitatively in terms of a model of ionospheric electric potential produced by the known dependence of Birkeland current densities on magnetic activity.

N81-27007/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Cooling of Young Neutron Stars and the Einstein X-Ray Observations.
K. Nomoto, and S. Tsuruta. Jun 81, 21p NASA-TM-82145
Submitted for Publication.

Cooling of neutron stars is calculated using an exact stellar evolution code. The full general relativistic version of the stellar structure equations are solved, with the best physical input available. For neutron stars with a stiff equation of state, it is found that the deviation from the isothermality in the interior is significant and that it takes at least a few thousand years to reach the isothermal state. By comparing theoretical and observational results, it is concluded that for Cas A, SN1006, and probably Tycho, standard cooling is inconsistent with the results from the Einstein Observatory, if neutron stars are assumed to be present in these objects. On the other hand, the detection points for RCW103 and the Crab are consistent with these theoretical results.

N81-27008/4 PC **A24**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
The Sun as a Star.
S. D. Jordan. Jul 81, 559p NASA-SP-450, REPT-81F0008
Sponsored in Part by Cnrs.

No abstract available.

N81-27028/2 PC **A05**/MF **A01**
TRW Systems Group, Redondo Beach, CA.
Cometary Particulate Analyzer Design Definition Study.
Final Report.
N. G. Utterback. Jan 81, 85p NASA-CR-164524, TRW-34645
Contract NASW-3314

A concept for remotely determining the relative abundance of elements contained in cometary particulates collected by a spacecraft was conducted with very encouraging results. The technique utilizes a short high intensity burst of laser radiation to vaporize and ionize collected particulate material. Ions extracted from this laser-produced plasma are analyzed in a time of flight mass spectrometer to yield an atomic mass spectrum representative of the relative abundance of elements in the particulates. A prototype analyzer system was designed, constructed, and tested. Results show that: (1) energy-time focus performs as predicted in improving resolution; (2) power densities sufficient to produce usable ionization efficiencies can be obtained; (3) complex alloys such as stainless steel can be analyzed; and (4) a tiny, simple and reliable laser used in the demonstration easily meets spacecraft power and mass limitations. A mass resolution of 150 was experimentally

demonstrated at mass 108, and an analytical extrapolation predicts a resolution sufficient to separate masses 250 and 251.

N81-27029/0 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
The Cooling and Condensation of Flare Coronal Plasma.
S. K. Antiochos, and P. A. Sturrock. Apr 81, 24p NASA-CR-164506, SU-SUIPR-839
Contracts NGL-05-020-272, N00014-75-C-0673

A model is investigated for the decay of flare heated coronal loops in which rapid radiative cooling at the loop base creates strong pressure gradients which, in turn, generate large (supersonic) downward flows. The coronal material cools and 'condenses' onto the flare chromosphere. The features which distinguish this model from previous models of flare cooling are: (1) most of the thermal energy of the coronal plasma may be lost by mass motion rather than by conduction or coronal radiation; (2) flare loops are not isobaric during their decay phase, and large downward velocities are present near the footpoints; (3) the differential emission measure q has a strong temperature dependence.

N81-27031/6 PC **A03**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Synchrotron Brightness Distribution of Turbulent Radio Jets.
R. N. Henriksen, A. H. Bridle, and K. L. Chan. Jun 81, 45p NASA-CR-164262, SU-SUIPR-844
Contract NGR-05-020-668

Radio jets are considered as turbulent mixing regions and it is proposed that the essential small scale viscous dissipation in these jets is by emission of MHD waves and by their subsequent strong damping due, at least partly, to gyro-resonant acceleration of supra-thermal particles. A formula relating the synchrotron surface brightness of a radio jet to the turbulent power input is deduced from physical postulates, and is tested against the data for NGC315 and 3C31 (NGC383). The predicted brightness depends essentially on the collimation behavior of the jet, and, to a lesser extent, on the CH picture of a 'high' nozzle with accelerating flow. The conditions for forming a large scale jet at a high nozzle from a much smaller scale jet are discussed. The effect of entrainment on the prediction is discussed with the use of similarity solutions. Although entrainment is inevitably associated with the turbulent jet, it may or may not be a dominant factor depending on the ambient density profile.

N81-27032/4 PC **A03**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Radio Jet Refraction in Galactic Atmospheres with Static Pressure Gradients.
R. N. Henriksen, J. P. Vallee, and A. H. Bridle. May 81, 30p NASA-CR-164260, SU-SUIPR-845
Contract NGR-05-020-668

A theory of double radio sources which have a 'Z' or 'S' morphology is proposed, based on the refraction of radio jets in the extended atmosphere of an elliptical galaxy. The model describes a collimated jet of supersonic material bending self-consistently under the influence of external static pressure gradients. Gravity and magnetic fields are neglected in the simplest case except insofar as they determine the static pressure distribution. The calculation is a straightforward extension of a method used to calculate a ram-pressure model for twin radio trails ('C' morphology). It may also be described as a continuous-jet version of a buoyancy model proposed in 1973. The model has the added virtue of invoking a galactic atmosphere similar to those already indicated by X-ray measurements of some other radio galaxies and by models for the collimation of other radio jets.

PB81-215907 PC **A02**/MF **A01**
Oxford Univ. (England). Nuclear Physics Lab.
A Model of the Normal and Null States of Pulsars,
P. B. Jones. 1981, 25p 24/81

A solvable three-dimensional polar cap model of pair creation and charged particle acceleration has been derived. There are no free parameters of significance apart from the polar surface magnetic flux density. The parameter CO determining the acceleration potential difference has been obtained by calculation of elementary nuclear and electromagnetic process. Solutions of the model exist for both normal and null states of a pulsar, and the instability in the normal state leading to the normal to null transition has been identified. The predicted necessary condition for the transition is entirely consistent with observation.

PB81-222895 PC **A09**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
Compressible Convection in a Rotating Spherical Shell,
Gary A. Glatzmaier. 1980, 200p NCAR-CT-60
Grant NSF-ATM77-23757

A hydrodynamical model of giant cell convection is used to gain further understanding of how differential rotation is maintained on the Sun. This model includes three major requirements for such an undertaking: rotation, spherical geometry, and compressibility. However this work represents only the first step for such models because it is limited to linear, single mode calculations. The work begins with the derivation of anelastic fluid equations for a compressible, rotating, spherical fluid shell. Then first order numerical solutions of these equations are found which describe the stability and structure of the giant cell convection in many different regions of parameter space. First order analytic solutions provide simple, physical explanations for the longitudinal phase propagation manifested in the numerical solutions. Second order numerical solutions are then calculated which described the mean differential rotation and meridional circulation induced by the first order solutions.

PB81-222903 PC **A06**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
Search for Optimal Three-Dimensional Mapping of the Solar Corona from K-Coronameter Data.
Technical note,
R. Michael Perry, and Martin D. Altschuler. Apr 81, 102p NCAR/TN-170
Grant NSF-ATM77-23757

To obtain improved maps of the coronal electron density distribution the authors have devised an iterative technique in which an approximation of the unknown distribution is sucessively modified to reduce discrepancies with the original data. With this technique, they can now map the corona to a much finer resolution than shown in their previous papers, without greatly increasing the computational cost. The series representation of density may now contain more than 23,000 terms compared with the previous limit of 128. This results in a fourfold increase in linear resolution, so that features about a tenth of a solar radius in width are now separate. The iteration algorithm can be adjusted to apply a mathematically 'optimal' correction to a given approximation of the density. Although this correction minimizes noise levels, a cheaper version of the algorithm yields a better result.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A100 621/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Preliminary Search for Cosmic Radiation and Solar-Terrestrial Parameters Correlated with the Reversal of the Solar Magnetic Field,
M. A. Shea, and D. F. Smart. 1981, 6p Rept no. AFGL-TR-81-0147
Pub. in Adv. Space Res., v1 p147-150 1981.

No abstract available.

AD-A100 658/4 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Garmisch-Partenkirchen (Germany, F.R.). Inst. fuer Atmosphaerische Umweltforschung.
Atmospheric Dust and Aerosol Study.
Data rept. Mar 76-Dec 78,
Reinhold Reiter, Hans Mueller, and Rudolf Sladkovic. Apr 81, 57p
Grant DA-ERO-77-G-035

Fluorescent particle tracer experiments have been conducted to study the dispersion processes in the north-alpine Loisach River Valley for a variety of meteorological conditions including inversion cases. This report summarizes the details of the experiments and presents all results, in particular the particle concentrations measured at various downwind locations by H-shaped Rotorod samplers together with the relevant meteorological conditions, in tabular form. The report is intended to serve as a data base for further analysis. (Author)

AD-A100 697/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Properties of the Mesosphere and Lower Thermosphere,
K. S. W. Champion. 1981, 20p Rept no. AFGL-TR-81-0168
Pub. in Advances in Space Research, v1 p133-150 1981.

No abstract available.

AD-A100 858/0 Not available NTIS
Maryland Univ., College Park. Dept. of Meteorology.
An Error Analysis of the Thornthwaite-Holzman Equations for Estimating Sensible and Latent Heat Fluxes over Crop and Forest Canopies,
O. E. Thompson, and R. T. Pinker. 3 Feb 80, 7p ARO-16755.2-GS
Contract DAAG29-80-C-0012
Availability: Pub. in Jnl. of Applied Meteorology, v20 n3 p250-254 Mar 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 862/2 PC **A09**/MF **A01**
New Mexico State Univ., Las Cruces. Physical Science Lab.
Experimental Investigation of Atmospheric Response to the Total Solar Eclipse of 26 February 1979. Conduct of Field Measurements. Phase III.
18 Apr 79, 180p
Contract DAAD07-78-C-0058

Principal objectives of the experimental program centered upon measurements of background atmospheric parameters and their changes during the eclipse in the altitude range of 30-200 km. The experimental program was highly successful. Approximately 96 percent of the more than 80 measurements carried out by the sounding rockets were successful in terms of instrument operation. During the eclipse energetic particles were precipitating into the atmosphere, a factor of considerable importance in the analysis of data obtained from the experimental program. The field program entailed coordinated operations at several sites with physical separations of up to 25 miles. Despite the generally cold weather (temperatures as low as -40 C), snowy conditions and nature of temporary installations, the oeprations were successful in meeting an inflexible schedule of activities while maintaining the critical ground support power, communications, telemetry and tracking.

AD-A100 980/2 PC **A02**/MF **A01**
Cincinnati Univ., OH. Dept. of Physics.

On the Effects of Atmospheric Gravity Waves on Profiles of H, O3, and OH Emission,
R. Hatfield, T. F. Tuan, and S. M. Silverman. 9 Jan 80, 11p AFGL-TR-81-0158
Contract F19628-78-C-0208
Pub. in Jnl. of Geophysical Research, v86 nA4 p2429-2437, 1 Apr 81.

No abstract available.

AD-A100 981/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
On the Literature of the Aurora in Nordic Countries,
S. M. Silverman. 1980, 7p Rept no. AFGL-TR-81-0171
Pub. in Exploration of the Polar Upper Atmosphere, p443-448 1980.

No abstract available.

AD-A100 982/8 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Dept. of Physics.
The Changing Aurora of the Past Three Centuries,
S. M. Silverman, and J. Feynman. 1981, 16p AFGL-TR-81-0172
Contract F19628-79-C-0031
Pub. in Exploration of the Polar Upper Atmosphere, p407-420 1980.

No abstract available.

AD-A101 006/5 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
On Short Term Variations of Zenith Polarization during Twilight,
Frederic E. Volz. 1981, 5p Rept no. AFGL-TR-81-0165
Pub. in Preprint Volume of Conference on Atmospheric Radiation (4th), Toronto (Ontario) 16-18 Jun 81, p111-114.

No abstract available.

AD-A101 007/3 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Investigation of Optical Constants of Aerosols,
Frederic E. Volz. 1981, 6p Rept no. AFGL-TR-81-0164
Pub. in Preprint Volume of Conference on Atmospheric Radiation (4th), Toronto (Ontario) 16-18 Jun 81, p97-100.

No abstract available.

AD-A101 048/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Solar Irradiance Calculations in the UV and Visible Using the Adjoint Discrete Ordinates Method,
S. A. W. Gerstl, A. Zardecki, and E. P. Shettle. 1981, 6p Rept no. AFGL-TR-81-0163
Pub. in Conference on Atmospheric Radiation (4th), p67-70, 16-18 Jun 81, Toronto (Canada).

No abstract available.

AD-A101 183/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Remote Sensing of NO Using a Differential Absorption Lidar.
Journal article,
Norman Menyuk, William E. DeFeo, and Dennis K. Killinger. 30 Apr 80, 6p JA-5103, ESD-TR-81-33
Contract F19628-80-C-0002
Pub. in Applied Optics, v19 n19 p3282-3286, 1 Oct 80.

No abstract available.

BNL-29497 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Dynamics of the Atmospheric Boundary Layer During the 1980 Total Solar Eclipse.
S. SethuRaman. 1981, 24p CONF-810144-2
Contract AC02-76CH00016
Solar eclipse symposium, New Delhi, India, 28 Jan 1981.

An atmospheric boundary layer experiment was conducted at Raichur, India to study the variations in the surface shear stress, heat flux and the meteorological processes that take place during a total solar eclipse. Interesting results were observed regarding the evolution of the planetary boundary layer. Changes in atmospheric stability from unstable to stable to unstable were observed during different phases of the eclipse. Downward propagation of negative heat flux associated with decreasing scales of convective eddies was also observed during the eclipse. (ERA citation 06:024118)

N81-26628/0 PC **A03**/MF **A01**
Danish Meteorological Inst., Copenhagen.
Rude Skov Geophysical Observatory: Magnetic Results, 1979.
1981, 42p ISBN-87-7478-187-1

The values of hourly means are based on photographic records from the following three variometers: an H variometer EH, a D variometer ED, both of the Edelmann type, and a Z variometer 250 of the type La Cour, a so called Godhavn balance. The three variometers recorded on three drums of an Edelmann normal rate recorder. Insensitive recordings of the three elements were obtained by a Mascart system, and a quick run recording by means of a La Cour system.

N81-26643/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Lightning Electric Field Measurements Which Correlate with Strikes to the NASA F-106B Aircraft, 22 July 1980.
D. M. Levine. May 81, 28p NASA-TM-82142

Ground-based data collected on lightning monitoring equipment operated by Goddard Space Flight Center at Wallops Island, Virginia, during a storm being monitored by NASA's F-106B, are presented. The slow electric field change data and RF radiation data were collected at the times the lightning monitoring equipment on the aircraft was triggered. The timing of the ground-based events correlate well with events recorded on the aircraft and provide an indication of the type of flash with which the aircraft was involved.

PB81-204232
(Order as PB81-204224, PC **A05**/MF **A01**)
Anhui Inst. of Optics and Fine Mechanics (China).
Effect of Transmission of Pulsed High-Power 10.6 Micrometer Laser on Atmosphere,
Zhiben Gong. 22 Oct 79, 6p
Included in Kexue Tongbao, v25 n6 p466-471 Jun 80.

The presence of atmospheric kinetic cooling caused by atmospheric absorption of 10.6 micrometer laser radiation has been proved through theoretical analysis and experiment. Breig expanded the work done by Wood et al. and after considering the adsorption saturation effect which was neglected by Wood et al., got an analytic expression for atmospheric temperature change caused by the atmospheric absorption of high-power CO2 laser radiation. However, they assumed the specific heat capacity at constant pressure and volume respectively. Now some problems have been encountered in he process of laser beam transmission through actual atmosphere. Under what conditions are the above assumptions to be made. Under what conditions can the absorption saturation effect be neglected. Can a much more general analytic expression of the atmospheric temperature change be derived. This paper is an attempt by the author to answer these questions.

PB81-221475 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Optical Attenuation in Clouds from Inversion of Multi-Wave-Length and Multi-Angle Lidar Data.
Technical memo.,
M. J. Post, and F. F. Hall, Jr. Apr 80, 24p NOAA-TM-ERL-WPL-68, NOAA-81050609
Sponsored in part by Naval Ocean Systems Center, San Diego, CA.

The purpose of this study was to determine if optical attenuation in clouds could be accurately determined solely by inverting multi-wavelength and multi-angle lidar data by means of the Backus-Gilbert inversion technique. This is an indirect method to attain the attenuation coefficient as the Backus-Gilbert inversion provides an estimate of the cloud droplet size distribution, and from this distribution the attenuation coefficient might then be calculated. This study directed its attention to a more narrow range of scattering angles. Specifically, there is a requirement to measure optical attenuation from naval ships so that bistatic lidar configuration would be limited by the dimensions of the vessel carrying the equipment. Although other methods of inverting lidar returns may yield 'better' results than Backus-Gilbert, this inversion technique permits one to investigate the information content of the measurements being made. Visually displaying the averaging kernels also helps indicate where and why errors in the results occur, and defines over what size interval the retrieved number density is applicable.

PB81-221608 PC **A07**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
An Analysis of Cloud Property Retrieval Using Infrared Sounder Data,
Bruce A. Wielicki. 1980, 139p NCAR-CT-61
Grant ATM77-23757

This thesis presents a theoretical analysis for the retrieval of cloud properties using infrared sounding radiometer data, such as that collected by the HIRS-2 instrument on TIROS-N. The cloud properties considered are effective cloud amount (emissivity times cloud fractional coverage in the satellite field of view), cloud top pressure, and the ratio of cloud emissivities in different spectral regions of the infrared. Chap. 1 examines the cloud amount errors and cloud top pressure errors caused by instrument noise and by uncertainties in estimated clear-sky radiances due to temp. profile and water vapor profile uncertainties. Chap. 2 examines the retrieval errors appropriate for a cloud climatology of average cloud amount within 1 km cloud height intervals. Chap. 3 examines the variation of cloud emissivity for the HIRS instrument spectral channels. Chap. 4 examines errors for the retrieval of HIRS channel emissivity ratios.

4B. Meteorology

AD-A100 860/6 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Study of Remote Wind Measurement Using Acoustic Angle-of-Arrival Techniques.
Final rept. Mar 78-Feb 81,
Philip B. Russell, Edward M. Liston, and Stephen A. DeLateur. Apr 81, 53p ARO-13850.1-GS
Contract DAAG29-78-C-0009

An angle-of-arrival sodar system was designed, built, and tested with the goal of determining boundary-layer winds. The system measures the backscattered signal induced in two closely space microphones on a single parabolic receiver antenna; the angle of arrival is calculated from the relative signal amplitudes. This is the acoustic analog of the amplitude-monopulse radar technique. However, the acoustic system uses distributed (atmospheric) targets and a fixed (not steerable) antenna. Test demonstrated that the system can receive atmospheric echoes and process the analog signals to estimate angle-of-arrival (hence, layer-averaged wind) when signal-to-noise ratios are adequate. However, the validity of these wind estimates was not demonstrated with correlative wind data. Digital processing techniques were implemented with the goals of automatic wind calculation, identification of adequate signal-to-noise ratios, and noise subtraction. Computer hardware limitations prevented achieving these goals. However, we believe that they could be achieved by using a computer with larger memory capacity. (Author)

DE81023617 PC **A09**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.

Environmental Data for Sites in the National Solar Data Network.
May 81, 188p SOLAR/0010-81/05
Contract AC01-79CS30027
Microfiche only after original copies are exhausted.

Environmental information collected at the sites of the National Solar Data Network is presented in the form of tables for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of total to extraterrestrial radiation, as a percent. The temperature table gives the average, daytime, nighttime, maximum, minimum and inlet-water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity values for day and night. It also gives values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is included. (ERA citation 06:023265)

N81-26644/7 PC **A06**/MF **A01**
FWG Associates, Inc., Tullahoma, TN.
Charged Particle Concepts for Fog Dispersion.
Final Report.
W. Frost, F. G. Collins, and D. Koepf. Jun 81, 122p NASA-CR-3440
Contract NAS8-33541

Charged particle techniques hold promise for dispersing warm fog in the terminal area of commercial airports. This report focuses on features of the charged particle technique which require further study. The basic physical principles of the technique and the major verification experiments carried out in the past are described. The fundamentals of the nozzle operation are given. The nozzle characteristics and the theory of particle charging in the nozzle are discussed, including information from extensive literature on electrostatic precipitation relative to environmental pollution control and a description of some preliminary reported analyses on the jet characteristics and interaction with neighboring jets. The equation governing the transfer of water substances and of electrical charge is given together with a brief description of several semi-empirical, mathematical expressions necessary for the governing equations. The necessary ingredients of a field experiment to verify the system once a prototype is built are described.

N81-26645/4 PC **A14**/MF **A01**
European Space Agency, Paris (France).
Satellite Meteorology of the Mediterranean.
T. D. Guyenne, and G. Levy. Feb 81, 320p ESA-SP-159, ISSN-0379-6566
Partly in English and French. Original Contains Color Illustrations. Proceedings of Intern. School of Meteorol. Of the Mediterranean, Erice, Italy, 12-22 Nov. 1980; CO-Sponsored by Italian Ministry of Public Education, Italian Ministry of Science and Technology Research, Cnr and Sicilian Regional Government.

No abstract available.

PB81-203986
(Order as PB81-203978, PC **A05**/MF **A01**)
Academia Sinica, Beijing (China). Inst. of Vertebrate Palaeontology and Palaeoanthropology.
Relationship Between Earth's Orbit and Climatic Changes.
3 May 79, 4p
Included in Kexue Tongbao, v25 n2 p165-167 Feb 80.

The author concludes that the distribution of winter insolation at 35 degrees N is critical to the variation of the mean annual temperature of the world.

PB81-217259 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
The Kipp Solarimeter: A Review of Its Operation and Calibration,
W. B. Gillett. c1980, 30p EUR-6815-3-EN
Prepared in cooperation with University Coll., Gardiff (England). Solar Energy Unit.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The design and performance characteristics of CM2 and CM5 models of Kipp solarimeter are discussed. Instrument calibration techniques are compared, with reference to the development of the International Pyrheliometric Scales. The results of a comparative calibration for the participants of the CEC Collaborative Programme on Solar Collector Testing are summarized.

PB81-218240 PC **A03**/MF **A01**
Illinois State Water Survey, Urbana.
Illinois Third Consecutive Severe Winter: 1978-1979.
Rept. of investigation,
Stanley A. Changnon, David Changnon, and Phyllis Stone. 1980, 42p ISWS/RI-94/80

In 1978-1979 a third consecutive severe winter occurred in Illinois for the first time since records began in the 1880s. Seventeen major winter storms, the state's record coldest January-February, and record snow depths gave the winter of 1978-1979 a rank as the second worst statewide for Illinois, exceeded only by the prior winter of 1977-1978. In the northern fourth of Illinois, the 1978-1979 winter was the worst on record. Average snowfall for the state was 42.8 inches, or 23.3 inches above normal. The 1978-1979 winter had a myriad of socioeconomic impacts, the most serious ones in the Chicago metropolitan area. Ten deaths and at least 60 serious injuries were attributed to the storms.

PB81-219610 PC **A08**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Variations in Climatic Characteristics as Related to Evapotranspiration in South Park, Central Park County, Colorado.
Final rept.,
Norman E. Spahr. 1981, 161p USGS/WRI-80-86, USGS/WRD/WRI/81-047

Data collected during May through September in 1977, 1978, and 1979 at three stations were analyzed using an analysis of variance technique to determine variations in climatic characteristics in South Park. Knowledge of these climatic characteristics will aid in determining the amount of water that may be transferred from agricultural use in South Park to municipal use in the Denver metropolitan area. Daily minimum air temperature, daily average air temperature, cumulative wind, daily relative humidity, and daily solar radiation were statistically different between the three stations at the 1-percent level of significance. Daily maximum air temperature and daily pan evaporation were not significantly different between the three stations.

PB81-220162 PC **A06**/MF **A01**
National Severe Storms Lab., Norman, OK.
Summary of AEC-ERDA-NRC Supported Research at NSSL 1973-1979.
Technical memo.,
J. T. Lee, Dusan S. Zrnic', Robert P. Davies-Jones, and Joseph H. Golden. Mar 81, 110p NOAA-TM-ERL-NSSL-90, NOAA-81043004

In 1973, the mutual interest in tornado wind and pressure structure witnessed the formation of a cooperative research program between the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storms Laboratory at Norman, Oklahoma and the Atomic Energy Commission (AEC) with its successor organization the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC). This report presents an overview of the research and results generated through the coordinated effort. This research proceeded along several lines - direct observations such as radar and photographic, indirect observations such as damage inferred wind flows, and modeling.

PB81-221012 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
The Wind Climatology of American Samoa.
Technical memo.,
John C. Bortniak. Mar 81, 72p NOAA-TM-ERL-ARL-98, NOAA-81050611

From an investigation of the tropical Pacific winds using previous work done in this area, three major sources of Samoa air were identified. The easterly trade winds are the most frequent source, and southerly air from the east of Australia occurs a large percentage of the time. The third source, occurring only a few percent of the time in the austral summer, is direct Northern Hemisphere air, which is normally blocked by the (ITCZ) Intertropical Convergence Zone. General features of tropical Pacific winds are also discussed.

PB81-222200 PC **A18**/MF **A01**
National Weather Service, Washington, DC. Climate Analysis Center.
Climate Diagnostics Workshop (5th) Annual Proceedings Held at Joint Institute for the Study of Atmosphere and Ocean, University of Washington, Seattle on October 22-24, 1980,
Jay S. Winston. Mar 81, 402p NOAA-81050604
See also Annual rept. no. 2. PB-282 151.

The Fifth Annual Climate Diagnostics Workshop, held at the Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, Seattle, on October 22-24, 1980, began with a review of the past year's climate fluctuations. This was followed by more general studies of variations in the large scale circulation. Session 3 dealt with data and methods for monitoring snow and ice, water vapor, and volcanic aerosols. Sessions 4 and 5 concentrated on the second major topic of large scale sea-air interactions with principal emphasis in Session 4 on the equatorial Pacific, Southern Oscillation, El Nino, and related phenomena. Session 6 dealt with modeling results.

PB81-222937 PC **A04**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
U.S. Monsoon Experiment (MONEX) Rawinsonde/Radiometersonde System,
Gerald A. Meehl, Robert B. McBeth, William C. Bolhofer, and Sushil Unninayar. Nov 80, 54p NCAR-TN/164+EDD
Grant NSF-ATM77-23757

The technical note describes a procedure to convert rawinsonde and radiometersonde observations from raw data into the standard message format in the field with the use of two inexpensive programmable calculators and a miniaturized wind-plotting board. The unique combination of elements of an automatic processing system concept (i.e. the simple programmable pocket calculator) and aspects of the more conventional graphical analysis method (i.e. the small-scale wind-plotting board) makes the system described here economical, portable, and easy to operate by supporting personnel with a minimum of training, especially in locations with difficult logistical requirements. This method was developed at the National Center for Atmospheric Research (NCAR) for use with portable rawinsonde and radiometersonde systems at remote field sites in Southeast Asia and Nepal in support of the upper-air observational program of the International Monsoon Experiment (MONEX) in 1978-79. The success of the system and data analysis method points to its use as a reference for future field applications.

PNL-3435 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Wind Measurement Systems and Wind Tunnel Evaluation of Selected Instruments.
J. V. Ramsdell, and J. S. Wetzel. May 81, 79p
Contract AC06-76RL01830

The Pacific Northwest Laboratory has conducted wind tunnel tests of seven relatively inexpensive wind measurement systems as part of a program to evaluate the accuracy and reliability of instruments for use in small wind energy conversion system siting studies. This report discusses wind measurement systems and documents the results of the wind tunnel studies. Documentation consists of graphs and tables relating system and system component performance to wind speed. The results describe instrument system performance

under ideal conditions; tests in the atmosphere are required to evaluate performance under realistic conditions. (ERA citation 06:021978)

SOLAR/0010-81/04 PC **A09**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
April 1981 Environmental Data for Sites in the National Solar Data Network.
A. A. Longnecker. Apr 81, 185p
Contract AC01-79CS30027

Environmental data collected from solar energy systems in residential and commercial buildings are tabulated for solar sites in the Network for which data are found to be valid. The sites are grouped in 12 zones. Available meteorological data are provided for insolation, temperature, wind speed and direction for all passive and some active solar sites, and humidity. The pyranometers used to measure insolation, the resistance temperature detectors, wind sensors, and humidity sensors are described, and the way data were taken is discussed. (ERA citation 06:021741)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A100 648/5 PC **A04**/MF **A01**
Army Procurement Research Office, Fort Lee, VA.
Contractor-Furnished Equipment versus Government-Furnished Equipment.
Final rept.,
Charles M. Lowe, Jr. May 81, 60p Rept no. APRO-80-10

Two methods are utilized to provide the components/sub-systems for a Government contract: contractor-furnished equipment (CFE) or Government-furnished equipment (GFE). DAR 13-201 states it is the general policy of the Department of Defense that contractors will furnish all equipment required for the performance of Government contracts. However, the Government should furnish equipment to a contractor when it is determined to be in the best interest of the Government by reason of economy, standardization, the expediting of production, or other appropriate circumstances. A model is developed to assist in the analysis for a decision to use CFE or GFE. The use of structured analysis of the subjective areas involved in using either approach provides for a more defensible business decision. (Author)

AD-A100 664/2 PC **A03**/MF **A01**
Office of the Under Secretary of Defense for Research and Engineering, Washington, DC.
Embedded Computer Resources and the DSARC Process - A Guidebook. Revision,
H. Mark Grove, and Lee A. Schumacher. Apr 81, 31p
Revision of report dated 1977, AD-A046 398.

The guidebook provides guidelines to access the adequacy of embeded computer resources planning and utilization. Separate sections address Defense System Acquistion Review Council (DSARC) milestones I, II, and III (Demonstration and Validation decision, Full-Scale Development decision, and Production and Deployment decision, respectively). Definitions of computer resource terms are given as is a matrix of available regulations and standards that pertain to various computer resource topics.

AD-A100 855/6 PC **A09**/MF **A01**
Management Consulting and Research, Inc., Falls Church, VA.
Cost Implications of Hardware Manpower Balance. Phase II - Unit Sustainment Manpower cost Methodology.
Final technical rept. Nov 80-Jun 81,
Rodney D. McConnell, Patricia A. Insley, William E. Depuy, Jr., Jerome C. Ford, and Clifton N. Horton. 1 Jun 81, 183p Rept no. MCR-TR-8006-2
Contract MDA903-80-C-0553
See also Rept. no. MCR-TR-8006-1.

Management Consulting & Research, Inc. (MCR) has developed analytical tools to assist in evaluating weapon system manpower requirements. The tools are: a definition for analyzing weapon system unit manpower requirements in terms of their high-cost/critical occupations; and a methodology for costing weapon system unit manpower which reveals occupation- and pay grade-specific cost relationships of the weapon system unit manpower requirements. This report documents the following results: The application of the definition of high-cost/critical occupations, which is a refinement of the Phase I definition. A description of the unit sustainment manpower cost methodology, which includes a refinement of the initial unit methodology. The unit sustainment manpower cost data for selected weapon systems that refines the initial unit test data. A description and demonstration of the unit manpower life cycle cost methodology which includes initial unit and unit sustainment cost methodologies. The application of the analytical tools in the analysis of weapon system manpower requirements. The definition and cost methodology are demonstrated using unit manpower for three major weapon systems: the Army M-1 tank, the Navy LAMPS Mk III helicopter system, and the Air Force ground launched cruise missile. (Author)

AD-A100 882/0 PC **A03**/MF **A01**
Army Engineer Studies Center, Washington, DC.
USACE Mobilization Posture Update: 1981.
Final rept.,
James H. Tate. May 81, 49p Rept no. R-81-4

This report assesses the US Army Corps of Engineers (USACE) mobilization posture in light of MOBEX 80. There remain a number of areas in which efforts or improvements are necessary if USACE is to fulfill its mobilization roles. Recommendations are made for enhancing USACE's posture. (Author)

AD-A100 894/5 PC **A04**/MF **A01**
Science Applications, Ind., McLean, VA. Center for Security and Policy Studies.
Implications for Arms Control in Technology Transfer to Less Developed Countries (LDC's) Volume I. Considerations in Controlling Dual-Use Technology Products: An Overview.
Final rept. Sep 78-Sep 80,
David E. Murphy, and James O. Frankosky. Sep 80, 74p
Contract AC8WC122
See also Volume 4, AD-A100 895.

This volume provides some insights into possible motivations and potential paths for less developed countries to exploit dual-use technologies in achieving indigenous capabilities in potentially destabilizing systems such as surface-to-surface missiles, attack aircraft, tanks, and fast attack (Naval) craft/missiles. (Author)

AD-A100 895/2 PC **A04**/MF **A01**
Science Applications, Ind., McLean, VA. Center for Security and Policy Studies.
Implications for Arms Control in Technology Transfer to Less Developed Countries (LDC's) Volume IV. Essays on the Role of Coproduction and Dual-Use Technology in the Development of LDC Arms Industries.
Final rept. Sep 78-Sep 80,
David E. Murphy, and James O. Frankosky. Sep 80, 73p
Contract AC8WC122
See also Volume 1, AD-A100 894.

This volume examines motivating factors, infrastructures, and patterns in arms development and production, as they relate to the role of coproduction and dual-use technologies in the development of indigenous arms industries in less developed countries. (Author)

AD-A100 972/9 PC **A04**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Development of an Organizational Survey Feedback Program for the 32D Air Defense Command.
Final rept.,
Donald G. Walizer, and John R. Mietus. Mar 80, 56p Rept no. ARI-TR-433

In the U.S. Army's Organizational Effectiveness Program, the General Organization Questionnaire (GOQ) serves as the primary diagnostic survey instrument for measuring organizational climate. This project: (a) tailored the GOQ and its data processing (ADP) and feedback systems to the unique situation of the 32d Air Defense Command (AADCOM); and (b) examined the psychometric properties of the basic GOQ instrument. The GOQ was tailored to the 32d AADCOM's situation. It was administered to more than 2,000 headquarters battery personnel in late 1977. Because there was no GOQ ADP system in U.S. Army-Europe (USAREUR) during the project, systems for processing data and returning results to commanders were built and then used. Interscale correlation and inter-item reliability coefficients were computed. To help assess the impact of the procedures as viewed by commanders, a short evaluative questionnaire was used. Five of six major indices of the GOQ were left intact; these measured unit climate, supervisory leadership, co-worker interaction, and work group processes. Questions on norms and values, job satisfaction, personal adjustment, family life, and equal opportunity were added. Internal consistency scale reliability coefficients averaged .75. There was no curtailment in the range of item responses. Interscale correlation coefficients are higher than desired in an instrument used for differential diagnoses. The data processing system was unwidely but workable. Data feedback was to the top levels of the command, where it had policy impact; and to battery commander, where it had minimal practical impact, as perceived by unit commanders.

AD-A101 135/2 PC **A05**/MF **A01**
Decisions and Designs, Inc., McLean, VA.
Decision-Analytic Support of the United States Marine Corp's Program Development: A Guide to the Methodology.
Final rept.,
Kenneth P. Kuskey, Kathleen A. Waslov, and Dennis M. Buede. May 81, 94p Rept no. PR-81-6-158
Contract M00027-80-C-0047
See also Rept. No. UM-81-1-158.

Within the Department of Defense's (DoD's) planning, programming, and budgeting system (PPBS), the role of programming is to transform defense needs into a time-phased program of affordable and achievable defense activities. Priorities among these activities must be established, and this requires professional military as well as civilian government judgments about the relative importance of various defense needs. Thus the programming phase of PPBS is the critical step in which professional judgment is matched to resources to create the tangible objectives of the DoD. To strengthen its programming system within the Dod PPBS, the Marine Corps (MC) has recently introduced and tested new, more efficient and reliable techniques for collecting and utilizing the professional judgment of its staff. The new techniques have been developed using the management discipline of decision analysis. The result is a practical, conceptually advanced methodology that has succeeded in developing consensus among the MC staff where other procedures have failed. This report describes the decision-analytic methodology used by the MC in its programming, not merely overviews. It is suitable as a reference, and it may be used for training. (Author)

AD-A101 140/2 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Enhanced Decision Analysis Support System.
Master's thesis,
David B. Lee. Mar 81, 173p Rept no. AFIT/GST/OS/81M-8

The enhanced version of the Decision Analysis Support System (DASS) is a highly interactive computer-aided decision analysis tool. It automates the method for determining preferences when multiple and competing attributes are involved. Worth assessment is used as the model which evaluates a deterministic hierarchical tree structure, although risk can be evaluated by incorporating risk into the tree or by conducting sensitivity analyses. The objective of this work was to incorporate the DASS (originally developed by Bruce W. Morlan) onto a microcomputer using PASCAL. The second objective was to exploit the color graphics capability on the microcomputer system for both input and output displays. The final objective was to add capability to the DASS by adding additional sensitivity analysis modules. All objectives were met in this work. Additional exploitation of the computer graphics, as well as some preprocessing of the tree structure are areas suggested for further exploration. (Author)

AD-A101 142/8 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Multi-Attribute Decision Analysis Approach to the Development of a Computerized Aid to Mission Planning (MADCAMP).
Master's thesis,
Robert H. Whitney, and Jack L. Wilson. Mar 81, 168p Rept no. AFIT/GST/OS/81M-11

This study investigates the problem of real time low-level mission planning against highly transient targets within the Battlefield Air Interdiction (BAI) environment. The dual objective was to test the feasibility of a computerized mission planning aid and reducing computer memory requirements to a level that would allow implementation of the mission planning aid on a modern mini-computer system. The model is based on concept of using Multi-Attribute Decision Analysis (MADA) to capture the decision making process of experienced mission planners and Selective Terrain Mapping (STM) to reduce the computer data storage requirements. The model uses a dynamic programming algorithm to produce an 'optimal' flight path through a given environment. Optimality is based entirely on the ability to capture the mission planners decision making process. From the results of this study, it was concluded that the approach is feasible, the model will produce acceptable flight paths, the mission planners' decision making process can be captured using MADA, and STM will adequately reduce the computer storage requirements. (Author)

DOE/MA-0003 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Management and Administration.
Management of Government Property in the Possession of off-Site Contractors (DOE-PMR 109-60).
Apr 81, 28p

This handbook contains Part 109-60 of the Department of Energy Property Management Regulations (DOE-PMR) (41 CFR Chapter 109) and is published to facilitate providing this portion of the DOE-PMR's to Department of Energy (DOE) offsite contractors. This Part 109-60 sets forth the minimum requirements to be observed by off-site contractors in establishing and maintaining control over Government property provided pursuant to a contract with DOE. The contract clauses of the DOE Procurement Regulations incorporate Part 109-60 by reference in all off-site contracts in which Government property is provided. (ERA citation 06:021461)

JPRS-77862 PC **A03**/MF **A01**
Joint Publications Research Service, Arlington, VA.
Material on June 1980 All-Union Conference on Development of Siberia.
17 Apr 81, 46p
Trans. of Ekonomika i Organizatsiya Promyshlennogo Proizvodstva (USSR) n12 p3-57 1980.

In June 1980, in Novosibirsk, an all-Union conference was held on the subject of 'The Development of Siberia's Productive Forces.' The 1980 conference was a very representative one. Assembling at it were around 2,000 persons from all the krays, oblasts and autonomous republics of Siberia. The work of the conference lasted 4 days and extensive recommendations were approved.

N81-26747/8 PC **A08**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
Timeline Resource Analysis Program (TRAP): User's Manual and Program Document.
J. G. Sessler. Jun 81, 158p NASA-CR-161812
Contract NAS8-31640

The Timeline Resource Analysis Program (TRAP), developed for scheduling and timelining problems, is described. Given an activity network, TRAP generates timeline plots, resource histograms, and tabular summaries of the network, schedules, and resource levels. It is written in ANSI FORTRAN for the Honeywell SIGMA 5 computer and operates in the interactive mode using the TEKTRONIX 4014-1 graphics terminal. The input network file may be a standard SIGMA 5 file or one generated using the Interactive Graphics Design System. The timeline plots can be displayed in two orderings: according to the sequence in which the tasks were read on input, and a waterfall sequence in which the tasks are ordered by start time. The input order is especially meaningful when the network consists of several interacting subnetworks. The waterfall sequence is helpful in assessing the project status at any point in time.

PB81-214124 PC **A04**/MF **A01**
Federal Interagency Committee on Urban Noise, Washington, DC.
Guidelines for Considering Noise in Land Use Planning and Control.
Jun 80, 55p

The purpose of this document is to put the various Federal agency policy and guidance packages into perspective. Although this document does not replace the individual Federal agency material, it can serve as the departure point for dealing with each agency's programs and facilitate the consideration of noise in all land use planning and interagency/intergovernmental coordination processes. Noise, like soil conditions, physiographic features, seismic stability, floodplains and other considerations, is a valid land use determinant. Scientific evidence clearly points to noise as not simply a nuisance but an important health and welfare concern. The purpose of considering noise in the land use planning process is not to prevent development but rather to encourage development that is compatible with various noise levels. The objective is to guide noise sensitive land uses away from the noise and encourage non-sensitive land uses where there is noise. Where this is not possible, measures should be included in development projects to reduce the effects of the noise.

PB81-216673 Not available NTIS
National Bureau of Standards, Washington, DC.
The Design and Implementation of an Office Application Using Existing High Level Tools.
Final rept.,
A. Mink, J. Knoerdel, and J. Brooks. 28 May 81, 13p
Proceedings of the Trends and Applications 1981: Advances in Software Technology held at Gaithersburg, MD., p150-162, 28 May 81.

An experiment was conceived to provide insight into the problems of implementing computer based office application (CBOA) services using existing high level computer based office systems (CBOS) tools. The first step was to select a routine office application that was currently being performed in our environment, and an existing hight level CBOS tool on which to build support for this application. Once the application and tool were selected, the office workers affected by this CBOA were encouraged to participate in the design and implementation process to gain the maximum feedback. The goals were to accomplish this implementation by using existing CBOS tools, doing no programming, and to have the users understand the implementation as well as the designers.

PB81-216970 PC **A08**/MF **A01**
Toulouse-3 Univ. (France).
Aid in Decision-Making for Real Time Workshop Management (Aide a la Decision pour l'Ordonnancement d'Atelier en Temps Reel).
Doctoral thesis,
Veronique Thomas. 26 Jun 80, 162p ORDER-2360
Text in French.

This study is concerned with the short-term level of decision-making. It is a special approach to real-time decision-making, based on a special concept of aids to decision-making. Possible decisions are set forth and analyzed in terms of internal constraints (technological, use of resources) and external restraints, such as due dates fixed at the mid-range level of decision-making. Decisions are selected on the basis of the concept of a critical track, set forth on a planning chart. An underlying framework of acceptable solutions is worked out as a series of group sequences. Management function is broken down into sections; models for each solution are developed. Results are computerized for aid in the decision-making process.

PB81-217986 PC **A06**/MF **A01**
National Training and Development Service for State and Local Government, Washington, DC.
Applying Science and Technology to Improve Local Government Productivity,
K. Janka, K. D. Rainey, F. Knight, and T. Urban. Dec 80, 110p NSF/RA-800488
Grant NSF-ISP77-19055
Prepared in cooperation with International City Management Association.

Some insights are outlined for ways to improve productivity and decrease the cost of local government service by making more effective use of science and technology (S&T). Existing systems of government can be modified through S&T input to the areas of perceptions and attitudes, authority systems, organizational structure, work methods, work flow and organization, and work force skills. Results of a survey of 205 cities indicated the high priority items to be able to predict ramifications and weigh consequences; ability to work with other departments; ability to train personnel; employee and labor relations; and human relations. Technology transfer must be supplemented by behavioral concepts concerning personal needs and intergroup relations of the workers. Steps involved in the process include preparation, or understanding the problems of the organization; formulation, or clarifying the issues; designing solutions; making plans and taking action; and evaluating the changes resulting from the actions taken. Early involvement of workers in identifying problems and implementing solutions is stressed.

PB81-218018 PC **A02**/MF **A01**
Vermont State Planning Office, Montpelier.
State Science, Engineering and Technology Project.
May 80, 12p NSF/RA-800501
Grant NSF-ISP80-04613

The Vermont State Science, Engineering, and Technology (SSET) Project was initiated to create a reservoir of expertise that could be tapped to provide advice to key decisionmakers on the scientific and technological (S&T) aspects of major issues facing the State. This report presents the plan and program for implementation of the project. It assesses the project's potential; outlines the structure, process, and procedure of the program; discusses linkage to SET resources; and identifies priorities for policy research and analysis. A review of five-year agency plans indicates the need for research and analysis in the following areas: transportation, development and community affairs; environmental conservation; education; energy; labor and industry; and health. Specific tasks for implementing the project are summarized.

PB81-221285 PC **A09**/MF **A01**
National Science Foundation, Washington, DC.
Research Applied to National Needs--1971-1977: A Program History of the First Six Years,
Arley T. Bever. May 78, 182p NSF/RA-780559
See also Volume 2, PB81-221293.

The survey, covering the period from March 1971 through March 1977, concentrates mainly on the first three years during which the initial organization and establishment of the RANN program policies and goals took place. It describes the policy shift at NSF from one in which research decisions

were left entirely to scientists to one in which public accounting of Federal expenditures for research and development (R&D) was required. Concepts and resulting actions which eventually led to the establishment of RANN as a free-standing applied domestic research funding program of the Federal government are outlined. Included are origins of the RANN task force, RANN criteria for judging the suitability of research projects, the role of Congress, beginning problems of the energy program build-up and transfer, RANN reorganization, and a study of RANN strategy, future program directions, and evaluation.

PB81-221293 PC **A13**/MF **A01**
National Science Foundation, Washington, DC.
Research Applied to National Needs--1971-1977: Interviews with People Important to Its Early History, Volume II,
Arley T. Bever. 1978, 297p NSF/RA-780560
See also PB81-221285.

The volume presents the history of the first six years of the National Science Foundation's (NSF) program--Research Applied to National Needs (RANN). It consists of 14 interviews with people involved in the conception, organization, and implementation of the RANN program during the period of March 1971 through March 1977. The interviews were conducted between September 1976 and July 1977. Topics discussed include the RANN program's role in furthering immediate scientific needs of society; NSF's interaction with other government agencies as a result of RANN projects; the growth of NSF support for applied research through RANN; funding, organization ans staffing of RANN; and an evaluation and future research directions for the RANN program.

PB81-223273 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Status, Progress, and Problems in Federal Agency Accounting During Fiscal 1980.
Rept. to the Congress.
25 Jun 81, 64p AFMD-81-58
See also 1977, PB-281263.

Federal agency accounting systems are required to conform to the principles and standards prescribed by the Comptroller General. At September 30, 1980, 193 of the 301 accounting systems in the Federal Government had been approved. However, the unapproved systems account for the expenditures of more than half the Federal budget. In addition, many systems approved over a decade ago need to be reapproved. GAO reviews of accounting systems in operation are also summarized in the report.

PB81-872228 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Employee Participation in Business Management. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 155p

Employee participation and involvement in business management are considered in this bibliography from world literature. Topics discussed include employee communications, structures for employee participation and training for participation. (Contains 101 citations fully indexed and including a title list.)

5B. Documentation and Information Technology

AD-A100 600/6 PC **A04**/MF **A01**
Office of the Deputy Under Secretary of Defense for Research and Engineering (R/AT), Washington, DC.
Proceedings of the DoD Technical Information Conference for R&D Managers 16-17 March 1981.
May 81, 64p

Approximately 90 scientists, engineers, and technical managers from Government and industry participated in the conference and workshop sessions at the National Defense University. The principal recommendations were: an OSD level technical information focal point should be designated; technical information advisory council should be appointed; a DoD technical information program plan should be developed; and the Defense Technical Information Center should be designated as a major program element. (Author)

AD-A100 655/0 PC **A99**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
Compendium of Authenticated Systems and Logistics Terms, Definitions and Acronyms.
1 Apr 81, 832p Rept no. AFIT-LS-3-81

To provide such a source of officially authenticated terms, definitions and acronyms for the logistics community, a research effort was initiated (in 1968-69) by the School of Systems and Logistics to develop a glossary of logistics terms. The product of the research entitled 'A Compendium of Authenticated Logistics Terms and Definitions' is (was) designed to set forth not only the words and terms but also to clarify the semantics and the changes of nuance that persist within these terms.

AD-A100 663/4 PC **A08**/MF **A01**
Naval Material Command, Washington, DC.
Standard Technical Manual Identification Numbering System (TMINS). M0000-00-IDX-000 TMINS.
14 May 80, 168p
Supersedes report dated 1 Jun 78.

The Standard Technical Manual Identification Numbering Systems (TMINS) has been promulgated to initiate the implementation of a single significant numbering system for technical manuals and related technical documents procured by Naval Material Command (NMC) Components. TMINS may also be used for identifying publications and other documents when it is desired that they may be centrally controlled, tracked and indexed. The use of the single numbering systems will eliminate the complications in the Fleet that now result from the different numbering systems in use. In addition the single numbering system will aid the standardization of cataloging within the Systems Commands and will simplify the interfaces between TM data collection and TM information systems. This index and guide has two purposes: (1) To explain the concepts of the TMIN System and the composition of the TMINS number. (2) To provide the necessary data for proper applications of TMINS numbers.

AD-A100 678/2 PC **A05**/MF **A01**
National Classification Management Society, Alexandria, VA.
Classification Management. Journal. Volume XVI. 1980,
Jack A. Robinson. 1980, 84p

ontents: Part One - Proceedings of the Sixteenth Annual Seminar Some Thoughts on Defense Policy; Oversight, A Newcomer's View; Technology and U.S. National Security; Foreign Disclosure Policy - A View for the Eighties; Defense Procurement and Classification in the UK; GAO Meet Industrial Security; The Defense Investigative Service and Industrial Security - New Partners; Law and the Courts - A View from the Department of Justice; and How to Disclose While Protecting - A Case in Civil Litigation; Part Two - Annual Report and Selected Papers 16th Annual Meeting; To Review or Not to Review - Who's is the Question; Practical Exercises; The Body Politic and Its Protection. (Author)

AD-A100 703/8 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
The Production of the AGARD Multilingual Aeronautical Dictionary Using Computer Techniques,
Van A. Wente, J. C. Kirschbaum, and J. H. Kuney. Apr 81, 46p Rept no. AGARD-R-684

The AGARD Multilingual Aeronautical Dictionary (MAD), second edition, published in 1980, contained 7,300 technical terms defined in English but also translated into nine other languages. The preparation work was performed by some 250 scientists and engineers who were members of AGARD and involved the translation skills of staff in many of the NATO nations. Nearly all the compilation and setting work for the book was done by computer and automatic photo-composition, a task of great complexity and one which is unique. The purpose of this publication is to record how the task was approached, in terms of management planning; to state frankly what went wrong, so that these errors will not be repeated; and to make some modest reference to the successes of the programme. It does not deal in great detail with the technical aspects of the task. (Author)

AD-A100 720/2 PC **A10**/MF **A01**
TRW Defense and Space Systems Group, Huntsville, AL.
Applicability of SREM to the Verification of Management Information System Software Requirements. Volume I.
Final rept.,
R. P. Loshbough, M. W. Alford, J. T. Lawson, D. M. Sims, and T. R. Johnson. 30 Apr 81, 203p
Rept no. TRW-37554-6950-001-VOL-1
Contract DAHC26-80-C-0020
See also Volume 2, AD-A100 721.

This document concerns TRW's demonstration of the application of the Software Requirements Engineering Methodology (SREM) to an existing Government Detailed Functional System Requirements (DFSR). The objective of this effort was to demonstrate the power of SREM as a tool to verify a software requirement, with the goal of determining the extent to which it was a complete, consistent, and unambiguous document. Specifically, the intent was to attain an understanding of what SREM is, how it is used, and what capability it possesses for isolating discrepancies in an existing software specification. In addition, this effort was intended to provide the basis for assessing the potential of SREM for inclusion as a tool in the current Army ADP-system development life cycle.

AD-A100 721/0 PC **A23**/MF **A01**
TRW Defense and Space Systems Group, Huntsville, AL.
Applicability of SREM to the Verification of Management Information System Software Requirements. Volume II.
Final rept.,
R. P. Loshbough, M. W. Alford, J. T. Lawson, D. M. Sims, and T. R. Johnson. 30 Apr 81, 539p
Rept no. TRW-37554-6950-001-VOL-2
Contract DAHC26-80-C-0020
See also Volume 1, AD-A100 720.

This volume provides the appendices that accompany Volume I. Applicability of SREM to the Verification of Management Information System Software Requirements. It contains the following four Appendices: (1) Operation of REVS on the VAX System, (2) Regeneration of Requirements, (3) Application of RADX, and (4) Trouble Reports.

AD-A100 772/3 PC **A07**/MF **A01**
Center for Information and Numerical Data Analysis and Synthesis, West Lafayette, IN.
Thermophysical and Electronic Properties Information Analysis Center (TEPIAC). A Continuing Systematic Program on Data Tables of Thermophysical and Electronic Properties of Materials.
Final rept. 1 Jan-31 Dec 80,
Cho-Yen Ho. May 81, 141p AMMRC-TR-81-26
Contract DLA900-79-C-1007

This Annual Final Report on Contract No. DLA900-79-C-1007 covers the activities and accomplishments of the Thermophysical and Electronic Properties Information Analysis Center (TEPIAC) for the period 1 January to 31 December 1980. TEPIAC's activities reported herein include literature search, acquisition, and input of source information; documentation review and codification; material classification; information organization; operation of a computerized bibliographic information storage and retrieval system; data extraction and compilation; data evaluation, correlation, analysis, synthesis, and generation of recommended values; preparation and publication of handbooks,

data books, properties literature retrieval guides, state-of-the-art reports, critical reviews, and technology assessments; development of a computerized numerical data storage and retrieval system; technical and bibliographic inquiry services; and current awareness and promotion efforts. TEPIAC covers 14 thermophysical properties and 22 electronic, electrical, magnetic, and optical properties of nearly all materials at all temperatures and pressures and in all environments.

AD-A100 803/6 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Generalized Experiment Control and Data Acquisition System.
Master's thesis,
Arsenio R. Iloreta. Mar 81, 96p Rept no. AFIT/GCS/EE/81M-3

A portable, automated, generalized experiment control and data acquisition system was developed for the Materials Laboratory to fulfill some of its data automation needs. The system is portable in that all hardware components fit in an aluminum carrying case, except for the terminal which is separate. The need for portability requires the program to be loaded from the terminal minicassette tape. The collected data is likewise dumped into the minicassette. The Air Force method of requirements definition, IDEF0, was used to model the software requirements. It involves a top-down approach to development. The model, thus diagrammed, provided the general structure from which the program itself was written. Structured code and ample documentation form the basic programming technique implemented. The program is currently operational, the system having been utilized in two actual experiment set-ups. The requirement to load the program from the minicassette was not satisfied, however, because of some loader error. The program can presently be loaded using a floppy disk system.

AD-A101 014/9 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Manual of Documentation Practices Applicable to Defence-Aerospace Scientific and Technical Information. Volume IV. Section 10 - Security Storage and Control. 11 - Organisation and Management. 12 - Networks and External Sources of Information,
S. C. Schuler. Mar 81, 128p Rept no. AGARD-AG-235-VOL-4
See also Volume 1, AD-A060 478.

The last of four separately published volumes describing the basic documentation practices involved in the initial setting up and operation of an Information-Library organisation to provide defence-aerospace information services. The focus is on a practical, rather than theoretical, approach for both the senior person setting up a new system as well as junior staff who may be using the manual as a training aid. This volume consists of three main sections. The first is concerned with basic problems in the security control and storage of classified and other sensitive documents. Guidelines are given for setting up procedures for document movements, housekeeping and physical security. The second section gives a general background to organisational factors involved in establishing an information centre. It also discusses accommodation requirements, staffing, budgets and promotional activities. In the final section the basic aspects of the telecommunications and networking are reviewed and information given on the availability and use of on-line data bases in the USA and Europe. (Author)

AD-A101 092/5 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Unclassified Publications of Lincoln Laboratory. Volume 7.
Rept. bibliography 15 Dec 77-15 Dec 79.
15 Dec 79, 81p ESD-TR-79-318
Contract F19628-80-C-0002
See also Volume 6, AD-A062 413.

Contents: Quarterly Technical Summaries; Semiannual Technical Summary Reports; Miscellaneous Progress Reports; Technical Reports; Technical Notes; Journal Articles; Meeting Speeches; Author Index; and Subject Index.

DE81023235 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Proceedings of the Symposium: Perspectives on Scientific and Technical Information.
May 81, 161p ORNL-5749, CONF-8009152
Contract W-7405-ENG-26
Perspectives on scientific and technical information symposium, Oak Ridge, TN, USA, 9 Sep 1980. Microfiche only after original copies are exhausted.

The first symposium on scientific and technical information sponsored by the Oak Ridge National Laboratory's Information Center Complex was held September 9-10, 1980, in Oak Ridge, Tennessee. The symposium emphasized the growth of the information field as an important resource to researchers and examined the wide range of subject-related programs, facilities, and systems that are available. Ten speakers, representing industry, academia, and government, presented up-to-date coverage of the many facets of information work. Topics covered included prospect and challenges, analysis patterns, transparent systems, the role of marketing, entrepreneurial opportunities, the management of data bases and federal libraries, and a review of the field from early automated efforts to futuristic possibilities. (ERA citation 06:024838)

DOE/EIA/10313-T1 PC **A03**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Report on an Analysis of Selected EIA Publications.
Oct 80, 45p
Contract AC01-80EI10313

Results of a critical analysis of the EIA publication Electric Power Monthly (EPM) are presented. A general review of the publication, a review of the tables, and a review of the graphs are given. Each of these is divided into two areas: substantive review, which concentrates on the organization and comparability of the data; and the cosmetic review, which focuses on the graphic presentations of the data. Recommendations, the rationale behind each recommendation, and examples of improvements that can be made to the various parts of the publication are discussed. (ERA citation 06:024834)

DOE/EIA/10313-T2 PC **A06**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Review of a Proposed Quarterly Coal Publication.
Jan 81, 107p
Contract AC01-80EI10313

This Review of a Proposed Quartery Coal Publication contains findings and recommendations regarding the content of a new summary Energy Information Administration (EIA) coal and coke publication entitled The Quarterly Coal Review (QCR). It is divided into five sections: results of interviews with selected EIA data users; identification of major functions of the coal and coke industries; analysis of coal and coke data collection activities; evaluation of issues conerning data presentation including recommendations for the content of the proposed QCR; and comparison of the proposed QCR with other EIA publications. Major findings and recommendations are as follows: (1) User interviews indicate a definite need for a compehensive publication that would support analyses and examine economic, supply and demand trends in the coal industry; (2) the organization of the publication should reflect the natural order of activities of the coal and coke industries. Based on an analysis of the industries, these functions are: production, stocks, imports, exports, distribution, and consumption; (3) current EIA coal and coke surveys collect sufficient data to provide a summary of the coal and coke industries on a quarterly basis; (4) coal and coke data should be presented separately. Coke data could be presented as an appendix; (5) three geographic aggregations are recommended in the QCR. These are: US total, coal producing districts, and state; (6) coal consumption data should be consolidated into four major consumer categories: electric utilities, coke plants, other industrial, and residential commercial; (7) several EIA publications could be eliminated by the proposed QCR. (ERA citation 06:022991)

DOE/EIA/10313-T4 PC **A02**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Final Summary Report on an Analysis of Selected Energy Information Administration Publications.
1981, 8p
Contract AC01-80EI10313

This document summarizes work designed to provide the EIA Office of Energy Data Operations with a comprehensive analysis of selected EIA publications. The analysis includes recommendations for the replacement, elimination, or integration of forms, data series, data systems, data bases, and publications. It also suggests improvements in the content, format, and structure of an integrated publications series for selected major energy areas. Tabular and graphical tables documenting interrelationships between and among data elements contained in publications were developed and prepared. A description of the work performed to date is given and includes a summary of findings on: Electric Power Monthly (EPM); The Quarterly Coal Review (QCR); Review of the Proposed Quarterly Coal Review; Review of the Coal and Electric Sections in the Monthly Energy Review. Recommendations are summarized. (ERA citation 06:022989)

DOE/EIA/10313-T5 PC **A03**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Review of the Proposed Quarterly Coal Review.
Apr 81, 41p
Contract AC01-80EI10313

This Review of the Proposed Quarterly Coal Review is the second of two reports and contains the results of our analysis of issues regarding the publication of a new summary publication, the Quarterly Coal Review. The first report on the QCR was submitted to the Office of Energy Data Operations (OEDO) in January 1981 and included results of our analysis and recommendations concerning data availability and content organization. This report concentrates on data presentation and publication format for the proposed QCR. Comprised of two sections, the report addresses chapter and table formats and presents a detailed analysis of chapter content. The first section of this report, Chapter, Table and Graph Formats, consists of findings and recommendations on the ordering, titling, end notes and cosmetics of the tables proposed for the QCR. The next section, Detailed Analysis of Chapter Content, is the result of a more in-depth analysis of chapters in the QCR. (ERA citation 06:022993)

DOE/EIA/10313-T6 PC **A07**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Review of the Coal and Electric Sections in the Monthly Energy Review and an Overall Review of Office of Energy Data Operations Publications.
Apr 81, 126p
Contract AC01-80EI10313

This Review of the Coal and Electric Sections of the Monthly Energy Review and an Overall Review of OEDO Publications is comprised of two sections. The first, Review of Coal and Electric Power Data in the Monthly Energy Review consists of a detailed analysis of content and data presentation issues. The major findings of this section are summarized below: the coal and electric power data in the Monthly Energy Review (MER) represent the major functions of the respective industries; coal data by rank are inconsistently presented in the MER; coal value or coal cost and quality data are not adequately represented in the MER; the presentation of two or more units of measurement on the same table in MER may invite incorrect comparisons unless properly separated (e.g., - double line separation); to improve the timeliness of the data in the MER, the increased use of estimated, preliminary, and/or projected data should be considered; and the table and graphic formats used in the MER present the data clearly and concisely. The second section of the report, An Overall Review of OEDO Publications, contains the results of an analysis of data presentation in forty-six coal, gas, electric, oil and consolidated publications. A summary of our findings and recommendations is listed below: where practical, a scope of publication section and executive summary should be included in OEDO publications; table formats, in-

cluding titles and endnotes should be uniform; more detailed guidelines for titling should be established by the Energy Information Administration (EIA); and a more detailed set of standards for footnotes, notes and source notes should be established by EIA. (ERA citation 06:022994)

LBL-12350 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Modelling Summary Data.
R. R. Johnson. 1981, 18p CONF-810467-2
Contract W-7405-ENG-48
SIGMODE international conference on management of data, Ann Arbor, MI, USA, 29 Apr 1981.

Several problems in specifying aggregate functions in relational systems are investigated. A solution is proposed to these problems in the form of an extension of the relational data model. In particular the concept of summary data is introduced. The query language STRAND is presented in order to describe retrieval operations on the extended model. STRAND allows a user to formulate queries involving aggregate functions without conceptualizing the query in terms of aggregation. Two example applications, proposal tracking and socio-demographic data bases, are used to illustrate the concepts of the extended model. (ERA citation 06:022990)

PB81-203978 PC **A05**/MF **A01**
Science Press, Beijing (China).
Kexue Tongbao. Volume 25, Number 2, February 1980.
Feb 80, 88p
See also PB81-203986, PB81-203994, PB81-204000, and Volume 25, Number 4, PB81-192270.

Contents:
- Approximation and expansion by rational in contain class of domains;
- Coefficient problems of holomorphic mappings on Reinhardt Domains;
- Spherical summability of multiple Fourier series and conjugate Fourier integrals;
- UMVUE of two-sided truncation parameters;
- An expression of symplectic matrices as a product of symplectic transvections;
- Intermediate vector particle model of the processes forbidden by Zweig Rule;
- Equations of motion for a spinning particle in gravitational field with torsion;
- Morphology and misfit of growth striae on boundaries of facetted and non-facetted growth sections in Czochralski grown LiNbO3 single crystals;
- High resolution parallel plate electron multiplier;
- Alkaloids of Sha Beimu identified as Fritillaria Karelinii Baker;
- BPR study of electron transfer between quinones and copper (II)-pyridine complex;
- Synthesis and polymerization of gamma alkoxy beta-hydroxypropi acrylates;
- Lincar correlation between T-value and number of 4f electrons in the calculation of lanthanides' ionization potential;
- A study of coastal upwelling off SE china;
- Relationship between earth's orbit and climatic changes;
- A new classification of mineral resources of the sea;
- An investigation on L-tyrosine crystal from Mawangdue Tomb No. 1 of Ham Dynasty in Changsha;
- Preliminary study on antiradiation effect of lingzhi;
- and Effect of electrical stimulation of acupuncture point 'medium spinae' on the contents of 5-HT and 5-HIAA in substantia nigra of midbrain in rabbits.

PB81-204224 PC **A05**/MF **A01**
Science Press, Beijing (China).
Kexue Tongbao. Volume 25, Number 6, June 1980.
Jun 80, 92p
See also PB81-204232, and PB81-204240.

Contents:
- Modified dirichlet problem and Quasiconformal mappings for nonlinear elliptic systems of first order;
- Products of to the (lambda) power and to the (mu) power;
- Unitary dilation of an operator;
- Effect of transmission of pulsed high-power 10.6 micrometers laser on atmosphere;
- Principle of structural invariability in electrohydraulic servo-system;
- Spin-glass transition of Fe6Mo18Ni76 alloy;
- Study on synthesis and properties of solid state complex of Ce (IV) with Dibenzo-18-Crown-6;
- Fluid description of solar wind plasma;
- Geological model of tectonic stress metamorphism of coal;
- Winter temperature changes during the last 500 years in South China;
- Th information formula of normal equal correlation factor;
- Thermal state of the Tanggula Region;
- A new mineral-ashanite (Nb, Ta, U, Fe, Mn)4O8;
- A new interpretation of the Yuemengou Group of North China;
- Spectral characterization of microsomal cytochrome p-450 from parasite fly Blepharipa Tibialis Chao;
- Synthesis of 3-half molecule (Nucleotides 36-76) of yeast alamine transfer RNA;
- and Agavain-SH, a newly discovered sulfhydryl protease in the Agave hybrid No. 11648.

PB81-204802 PC **A05**/MF **A01**
Science Press, Beijing (China).
Kexue Tongbao. Volume 25, Number 9, September 1980.
Sep 80, 93p
See also PB81-204810, PB81-204828, and PB81-204836.

Contents:
- An inequality in theory of optimum search trees;
- Static soultions of Yang-Mills-Higgs-Kibble systems;
- A parametric representation of quasi-conformal extensions;
- A closed form for the series formula of the superconducting critical temperature;
- On short-term correlation of cleaning discharges in Tokamak CT-6;
- Ionic polarization and the calculation of standard electrode potentials of elements;
- Studies on bioactive acrylic ester II--synthesis and polymerization of 3-Acrylato-4-OXO-3,4 -Dihydro-1,2,3-Benzotriazines;
- Asymmetric reduction of steroid intermediate by microorganism;
- The hubble diagram of QSOs by statistical method;
- On approximate analytical solutions of Poisson equation for inner region of galaxy disk with finite thickness;
- Scismomagnetic effect of Tangshan earthquake;
- The relationship between height and temperature of ice crystallization in cumulus clouds in Jiujiang area;
- New Middle Triassic Notostraca (Crustacea) from Toksum County, North Xinjiang;
- Transmission electron miscroscopy of the Jilin (Kirin) meteorite;
- Fission track dating of Peking Man;
- A study on formation of base fibers in the stem of Apocynum lancifolium Rus;
- Effect of Mg2+ on reconstitution of H+-ATPase of pig heart mitochondria into liposomes;
- Isolation of purple membrane from Halobacterium;
- Studies on bunchy disease of rice, a new virus disease of rice plnt;
- and Gold thioglucose hypothalamic obesity syndrome.

PB81-214389 PC **A11**/MF **A01**
Morris, Davis and Co., Oakland, CA.
The Uniform System of Home Health Agency Reporting: An Analysis of its Impact on Home Health Care Providers.
Gerald N. Siegel, Gary Homan, and J. Terry Flores. 30 Jun 80, 249p HCFA/PUB-03104
Grant HCFA-500-79-0013

The purpose of this study was to estimate the costs to implement and maintain the Uniform System for Home Health Agency Reporting (USHHAR). This study will provide information needed to revise the draft USHHAR and the data necessary for calculating the reporting burden when the system is ultimately revised. The identification of the areas of burden will be useful in reducing the scope of the reporting system, by identifying where incompatibilities exist.

PB81-214645 PC **A05**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
Writing Effective Reports.
Technical rept.,
B. M. Davies, J. M. Roche, H. Duffey, and J. M. Clifford. Mar 80, 100p RI/1/80

The Research Application and Information (RA & I) Group's course on report writing is designed to help NITRR's authors become better writers by giving them straight-forward rules for better style, and by encouraging them to criticize and revise their own work. Topics to be dealt with include audiences, structuring, grammar and references. Also covered are certain NITRR and CSIR in-house rules which have been developed over the years.

PB81-214686 PC **A08**/MF **A01**
Brussels Univ. (Belgium).
Computer-Aided Management of Requests for Photocopies Received by a Documentation Centre: Annual Report and Statistical Interpretation of Results (Gestion des Demandes de Photocopies Adressees a un Centre de Documentation: Rapport Annuel et Interpretation Statistique des Resultats),
Alexandre Troieepolsky. 1980, 160p
Text in English and French.

The dissertation describes a method for studying, by computer, requests to information centers and libraries for technical literature. Details of the requests, such as periodical title, date of publication, source of supply, language, etc. are stored, counted, ranked and compared to allow annual assessment to be made of factors influencing the spread between various types of requests. In addition, facultative registering of (a) authors and title of documents offers both the editing of bibliographies and the generation of permuted indexes for information retrieval; and of (b) requests circulation transactions allows the follow-up of documents supply activities. New computer programs have been developed for these purposes and are explained.

PB81-216335 PC **A06**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Information Harmonization in the Construction Industry by the Syntax Approach: An Exploratory Study,
A. M. Bouman, B. C. Edgill, and A. D. Gilchrist. c1980, 123p CIB/PUB-57

The report attempts to analyze information needs in the building industry internationally and to coordinate information systems between countries.

PB81-218398 PC **A07**/MF **A01**
Computer Data Systems, Inc., Bethesda, MD.
National Alcoholism Program Information System (NAPIS) Documentation. Volume 1: Data Collection Forms and Procedures. Third Edition.
Jan 81, 146p NIAAA/NCALI-81-09
Contract PHS-ADM-281-79-0007

The procedures manual is intended to provide detailed and comprehensive guidance to the staff member of an alcoholism treatment program, who has been designated as 'Data Coordinator' for the program, in fulfilling the data collection requirements of the National Alcoholism Program Information System (NAPIS). It contains copies and a discussion of all data collection forms and procedures as well as responsibilities of program staff members which must be assumed in order to support the data collection activity.

PB81-219180 PC **A08**/MF **A01**
Department of Education, Washington, DC.

Selected Bibliography of Egyptian Educational Materials: Volume 5, Number 4, 1979.
1981, 166p TT-79-59121/4
See also Volume 5, Number 3, PB81-123531. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, faculties, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, socia. aspects, objectives, and higher education.

PB81-220097 PC **A06**/MF **A01**
Wisconsin Univ.-Madison. Land Tenure Center.
East and Southeast Asia: A Bibliography,
Sep 79, 124p AID-PN-AAH-598
Contract AID/csd-2263
See also PB-219331.

As materials dealing with East Asia are extensive in the Land Tenure Center Library at the University of Wisconsin, a bibliography has been compiled listing those references. This document is a supplement to that bibliography. Approximately 1500 citations (1954-78) are entered for Asia, Central Asia, East Asia, China, Hong Kong, Japan, North Korea, South Korea, Macao, and Taiwan.

PB81-220212 PC **A03**/MF **A01**
Institute for Development Anthropology, Binghamton, NY.
The Sociology and Political Economy of the Sahel: An Annotated Bibliography,
Michael M. Horowitz, and John Van Dusen Lewis. May 79, 36p AID-PN-AAH-473
Contract AID/afr-C-1469

The bibliography is prepared as a guide, to assist development officers and contractor personnel in the identification, design, implementation, and assessment of socially sound programs and projects which both benefit rural low income populations in the Sahel and are based on their needs, interests, and participation.

PB81-220618 PC **A02**/MF **A01**
Institute for Development Anthropology, Binghamton, NY.
An Annotated Bibliography of the Sociology and Political Economy on Somalia, Sudan, and Tanzania,
Patrick Fleuret, Mohamud A. Jama, David Laitin, Muneera Salem Murdock, and Garry L. Thomas. Jun 79, 19p AID-PN-AAH-474
Contract AID/afr-C-1504

Development officers and contractor personnel who work with programs in Somalia, Sudan, and Tanzania can profit from using this annotated bibliography of the sociology and political economy of these countries. The bibliography was prepared to assist these personnel in the identification, design, implementation, and assessment of socially sound programs and projects of benefit to rural low-income populations.

UCRL-85310 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Multitest, DVM-Based Data Acquisition System on an LSI-11/23, Running under RSX-11M.
D. H. Liston, W. M. McDonald, and S. D. Koopman. 30 Apr 81, 13p CONF-810546-2
Contract W-7405-ENG-48
1981 spring DECUS U.S. symposium, Miami Beach, FL, USA, 18 May 1981.

A digital voltmeter (DVM) based data acquisition system that allows multiple simultaneous tests to be conducted concurrently was designed. Using an LSI-11/23 and the RSX-11M operating system, the system acquires, displays, and stores data from strain gages, load cells, etc. Post-test data can also be routed via DECNET to another node of the network for archiving or analysis. To ensure that the system would meet the needs of the users, several design documents were created that were agreed upon by the designers and users before any software was written. This design strategy had several advantages, described in this paper along with the performance problems, hardware selection, and software design. (ERA citation 06:022985)

5C. Economics

AD-A100 850/7 PC **A06**/MF **A01**
Information Spectrum, Inc., Arlington, VA.
Local Economic Factors Affecting Navy First-Term Reenlistment.
Final rept.,
M. T. Cowin, F. E. O'Connor, and A. S. Rhode. 7 Oct 80, 122p Rept no. ISI-V-0521-02
Contract N00014-79-C-0155

The effects of local economic factors on an individual's decision to reenlist or extend were investigated for a cohort of four year obligors who enlisted between April and September 1974 using probit maximum likelihood estimation. The attractiveness of the civilian labor market both at an individual's home town and at his duty station was represented by measures of local unemployment and relative wages. Additionally, Navy reenlistment incentives and demographic characteristics of the individual were investigated. Results indicated that, for some mechanical and administrative ratings, unemployment at an individual's home town at approximately the time of first assignment to a permanent duty station had a positive influence on the likelihood of remaining beyond the completion of a first term. Relationships between local labor market conditions and reenlistment behavior were generally weaker than the relationships observed between national economic conditions and reenlistment in previous studies. Promotion and reenlistment bonuses were shown to have a strong positive impact on the retention of all occupational groups. (Author)

AD-A100 896/0 PC **A04**/MF **A01**
Decision-Science Applications, Inc., Arlington, VA.
The DYNEVAL (Dynamic Economic Values) Model. Volume I. A Generalized Overview,
George E. Pugh, Max T. Nunenkamp, and Joseph C. Krupp. May 81, 54p Rept no. DSA-306-VOL-1
Contract AC00c104
See also Volume 2, AD-A100 897.

The first volume summarizes the basic design structure of the model; including the constraints; the economic objective function; the optimization methodology; and the basic mathematical formulation. DYNEVAL is a national economic model in which the underlying decision processes are governed by a dynamic balance of value considerations as these considerations are reflected in the power structure of the economy. Whereas most national economic models are designed to project short term trends or business cycles in the normal operation of an economy, DYNEVAL is designed to provide a fundamental assessment of the effect of major economic disruptions on the operation of an economy. Given a major disruption (such as a drastic change in the level of defense expenditures, a cut-off in oil imports, the loss of foreign markets, or the destruction of production facilities), the model shows how capital investment and production resources can be allocated within the economy to mitigate the resulting economic damage; and it provides an assessment of the overall economic impact, assuming an efficient allocation of resources within the economy.

AD-A100 897/8 PC **A07**/MF **A01**
Decision-Science Applications, Inc., Arlington, VA.
The DYNEVAL (Dynamic Economic Values) Model. Volume II. Documentation.
Final rept.,
George E. Pugh, Max T. Nunenkamp, and Joseph C. Krupp. May 81, 134p Rept no. DSA-306-VOL-2
Contract AC00C104
See also Volume 3, AD-A100 898.

Volume II provides documentation and user guide for the DYNEVAL (Dynamic Economic Values) Model. DYNEVAL uses Lagrange Dynamic Programming to chart through time the optimal trajectory of an economy which has either been disrupted in some way or in which value structures have been changed. (Author)

AD-A100 898/6 PC **A03**/MF **A01**
Decision-Science Applications, Inc., Arlington, VA.
The DYNEVAL (Dynamic Economic Values) Model. Volume III. Economic Recovery Analyses.
Final rept.,
George E. Pugh, Max T. Nunenkamp, and Joseph C. Krupp. May 81, 40p Rept no. DSA-306-VOL-3
Contract AC00C104
See also Volume 1, AD-A100 896.

This volume describes the results of studies using the DYNEVAL Model to analyze the problems of economic recovery following a large-scale nuclear attack. The volume also describes the adaptability of the soviet economy to increased military expenditures. (Author)

AD-A101 132/9 PC **A03**/MF **A01**
Duke Univ., Durham, NC. Graduate School of Business Administration.
Adding Asymmetrically Dominated Alternatives: Violations of Regularity & the Similarity Hypothesis.
Technical rept.,
Joel Huber, John Payne, and Chris Puto. Jul 81, 38p Rept no. TR-81-2-ONR
Contract N00014-80-C-0114

An asymmetrically dominated alternative is one that is dominated by one item in the set but not by another. It is shown that the addition to a choice set of such an alternative can increase the probability of choosing the item that dominates it. This result points to the inadequacy of many current choice models and suggests product line strategies that might not otherwise be intuitively plausible. (Author)

DOE/ET/26716-T1 PC **A05**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Preliminary Market Analysis for Customer Side of the Meter Thermal-Energy Storage.
31 Dec 79, 94p
Contract AC01-78ET26716

An examination is made of the potential market size for thermal energy storage space heating, water heating, and air conditioning in the residential and commercial sector. It is concluded that a significant market for TES could develop over the next 20 years; the analysis considers the electric utility perspective, the perspective, and the expected market in detail. (ERA citation 06:022193)

PB81-213621 PC **A06**/MF **A01**
Development Sciences, Inc., Sagamore, MA.
Enhancing Small Business Export in Fragmented Industries.
Final rept.,
G. B. Charles. 27 Feb 81, 105p DS-182
Grant SB-1A-00005-01-0

The report contains a review of successful examples of operational network formation which have helped small firms to export. The characteristics of fragmented industries (those comprised of small, geographically dispersed firms marketing under deadlines to turn over products) and the role of government agencies in aiding them are identified.

PB81-216285 PC **A03**/MF **A01**
National Telecommunications and Information Administration, Washington, DC.
Trade Issues in Telecommunications and Information. Volume I. United States Trade in the Merchandise of Information Industries,
Kenneth Leeson. Apr 81, 46p NTIA/REPORT-81-72-VOL-1
See also Volume 2, PB81-216293.
Also available in set of 3 reports PC E06, PB81-216277.

This is a study of the role of information goods and services in trade with emphasis on merchandise trade. Industries included in the information sector are specified and the relative significance of merchandise and services in this sector are estimated.

The study compares the comparative performance and relative significance of trade in the merchandise of information industries with merchandise trade in general; it compares trade performance of information merchandise that relies on conventional technologies with that which relies on newer technologies; an analysis is made of exports as a percentage of industry output for a number of industries. There is a discussion on the regional distribution of trade for selected industries.

PB81-216293 PC **A02**/MF **A01**
National Telecommunications and Information Administration, Washington, DC.
Trade Issues in Telecommunications and Information. Volume II. The Employment Effects of Trade in High-Technology Telecommunications and Information Products,
C. Randall Jacobson. Apr 81, 23p NTIA/REPORT-81-72-VOL-2
See also Volume 1, PB81-216285 and Volume 3, PB81-216301.
Also available in set of 3 reports PC E06, PB81-216277.

This study uses empirical data and a simulation model (input-output) to examine the employment effects of increased trade in twelve selected high technology telecommunications and information product categories.

PB81-216301 PC **A03**/MF **A01**
National Telecommunications and Information Administration, Washington, DC.
Trade Issues in Telecommunications and Information. Volume III. Promoting U.S. Trade in Telecommunications and Information Products with Developing Countries,
Kathleen M. White, and C. Randall Jacobson. Apr 81, 38p NTIA/REPORT-81-72-VOL-3
See also Volume 2, PB81-216293.
Also available in set of 3 reports PC E06, PB81-216277.

This paper examines the potential viability of developing countries as markets for U.S. telecommunications and information products. It includes an analysis of trends in market sizes, an overview of the most important suppliers of developing countries' telecommunications and information goods, a discussion of the problems associated with trading with developing countries, and a survey of U.S. efforts to promote trade with these regions.

PB81-216772 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
Efficiency of Flexible Foreign Exchange Markets,
Bradley Karmen, and Jitendar S. Mann. Jun 81, 18p AGESS-810602

Statistical analysis is performed on daily exchange rates of five countries to determine the efficiency of these markets. This study shows that successive one-period changes of the exchange rates are serially independent and the price changes follow a random walk.

PB81-216780 PC **A04**/MF **A01**
Virginia Univ., Charlottesville.
The Effects of 'Tight Money' on Small Business Mergers.
Final rept.,
John B. Guerard, Jr. Feb 81, 55p

The report studies the hypotheses that small businesses do suffer relative to large firms in that their costs of capital rise relative to the larger firms. The research investigates the tight money of 1969-70 and whether or not the great merger activity of larger firms acquiring small businesses could be correlated with the cost of capital and capital markets.

PB81-216855 PC **A12**/MF **A01**
Council on International and Public Affairs, New York.
Assessment of U.S.-Indian Science and Technology Relations: An Analytical Study of Past Performance and Future Prospects.
Final rept.,
Ward Morehouse, Brijen K. Gupta, and Anil Deolaliker. c1980, 256p CIPA-80/01
Contract NSF-INT77-26001

For India and the United States, the consequences of their 30-year relationship in science and technology have been mixed. India has made significant progress toward its goal of becoming a major world industrial power, of which a substantial national capacity in science and technology has been perceived by Indian leaders and planners as an essential ingredient. But its socio-economic goals of greater equity and less poverty have remained largely unfulfilled. The US has made a significant contribution to the growth of the modern sector of the Indian economy through both government-supported science and technology programs and private sector technology flows, although the primary effort has been Indian, not foreign. This has enabled the US to maintain a modest measure of policy influence. But realizing the equity goals of the 'new directions' in US economic policy toward developing countries which emerged in the 1970s has been as elusive for the US in its relations with India as for India itself. For the future, US-Indian science and technology relations offer greater scope for genuine cooperation between two less unequal partners and an arena for increasing conflict as India's industrial capacity becomes more directly competitive with the US.

PB81-217705 PC **A04**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Appendices A, B, C of Effects of Minimum Wage Policy on Inflation and on Output Prices, Employment, and Real Wage Rates By Industry,
James Cox, and Ronald Oaxaca. Jun 81, 57p
See also PB81-148678.

The econometric model used in the minimum wage simulations is documented in this appendix. The general specifications of the structural equations of the model are presented first. These are followed by the estimated equations used in the simulations. Finally, documentation is provided for all of the variables used in the study.

PB81-217895 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Industrial Specialization in Twelve European Countries Before and After 1973.
Series fast no. 1.
c1980, 81p EUR-6920-EN-FR, ISBN-92-825-1965-1
Sponsored in part by Centre d'Etudes Prospectives et d'Informations Internationales, Paris (France), and Forecasting and Assessment in the Field of Science and Technology, Brussels (Belgium).
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The report reviews the topic of international specialization, compares the specializations of twelve European countries, and identifies lines of research for a strategy of specialization which leads to improved Community cohesion.

PB81-218257 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
The American Woman's Economic Development Corporation: An Evaluation.
Jan 80, 91p
Grant EDA-99-10-00010

The American Woman's Economic Development Corporation (AWED) is a model enterpreneurial assistance program for women located in New York City which has been funded since its inception in 1976 by the Economic Development Administration's Office of Technical Assistance. The report contains a thorough documentation of program development and current operations; an assessment of program impact; and a set of recommendations addressing future program activities and possible funding strategies for EDA.

PB81-218679 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Barriers to Financial Reform.
Paper no. 5,
Robert C. Vogel. Aug 79, 33p AID-PN-AAH-350
Contract AID/ta-BMA-7
International Conference on Rural Finance Research Issues (2nd) held at Calgary, Canada on August 29-31, 1979.

Despite widespread agreement that rural financial reforms are needed in LDCs, arguments against the possibility of implementing such reforms are often heard. Four common arguments, all illustrative of existing barriers to financial reform are analyzed here.

PB81-218687 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
A Review of Empirical Studies of Demand for Agricultural Loans.
Paper no. 2,
Cristina C. David, and Richard L. Meyer. 1979, 40p AID-PN-AAH-347
Contract AID/ta-BMA-7
International Conference on Rural Finance Research Issues (2nd) held at Calgary, Canada on August 29-31, 1979.

Loan demand within LDCs is a growing economic activity and therefore merits greater understanding. This document is a review of recent loan demand studies from two perspectives: those concerned with loan demand projections; and those that quantify loan relationships.

PB81-218695 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
The Impact of Credit, Prices, Technology, and Extension on Fertilizer Demand in Rainfed Areas in the Philippines.
Paper no. 3,
Cristina C. David, Fe B. Gascon, and Randolph Barker. 1979, 25p AID-PN-AAH-348
Contract AID/ta-BMA-7
International Conference on Rural Finance Research Issues (2nd) held at Calgary, Canada on August 29-31, 1979.

Most attempts to identify the impact of credit on fertilizer use in the Philippines have failed to separate the impact of credit from that of other factors such as price, technology, and extension. This document attempts to separate quantitatively the various factors affecting fertilizer use in the country's rainfed areas.

PB81-218729 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Interest Rate, Transaction Costs and Financial Innovations.
Paper no. 13,
V. V. Bhatt. 1979, 44p AID-PN-AAH-358
Contract AID/ta-BMA-7
International Conference on Rural Finance Research Issues (2nd) held at Calgary, Canada on August 29-31, 1979.

Fragmentation of the capital market, that is, the phenomena of different markets for different products, as it occurs in the LDCs is generally attributed to high interest rates. The crucial variable in determining these rates is transaction costs (both administrative costs and default risk). Financial innovations (changes in production and consumption functions, introduction of new goods and services, changes in organization and market forms, etc.) reduce these costs and thus lower interest rates. The author gives a number of examples and emphasizes the need to move away from the usual discussion of interest rates based on factless theorizing and the macro approach to monetary and banking analysis.

PB81-218794 PC **A02**/MF **A01**
Miljoestyrelsen, Copenhagen (Denmark).
Subsidies for Environmental Investments (Stoette til Miljoeinvesteringer).
Sep 78, 22p ISBN-87-503-2673-2
Text in Danish, abstract in English.

This issue in the series 'News from the Environmental Protection Office' (Nyt fra miljostyrelsen) was written to inform the reader of changes in the law on subsidies for investments for the protection

of the environment, as of 1 June 1978. The Environmental Protection Law itself took effect on 1 October 1974. Businesses established after this date were able to take these regulations into account in their planning stage. Limitations and stipulations concerning the subsidies are described with emphasis on the changes that took effect on 1 June 1978.

PB81-218950 PC **A05**/MF **A01**
New Mexico Univ., Albuquerque. Business Assistance and Resource Center.
The University of New Mexico Institute for Applied Research Services.
Annual rept. 1 Nov 79-31 Oct 80.
1980, 98p EDA-81-079

This is the fourth annual report for the Business Assistance and Resource Center (BARC). This report covers BARC activities from November 1, 1989 through October 31, 1980. The Center's philosophy is providing an outreach mechanism for University of New Mexico resources in the area of business development which is vital in stimulating overall economic growth. In fostering this basic philosophy, the overall long-term goal of BARC is the improvement and stimulation of the economic base in New Mexico communities by assisting small business community, public officials were appropriate, and other groups and individuals in making sound decisions relating to economic growth.

PB81-219164 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
A Review of Inputs and Impacts of Coal-Based Synthetic Fuel Plants.
Staff rept.,
Thomas H. Shillington. Feb 81, 41p AGESS-810202

The report assesses published estimates of the inputs and local economic impacts of proposed coal-based synthetic fuel plants, and identifies gaps in assessment informational requirements. It concludes that the nature and magnitude of local economic impacts cannot be predicted accurately using available data. First, the few published estimates of synthetic fuel employment requirements and schedules often are out-of-date or contradictory. Second, growth management strategies for energy boom towns have not been adequately evaluated. Third, conventional assessments may not identify substantial structural changes in small rural economies undergoing rapid growth from sustained energy development. Finally, uncertainty -- about plant lifetimes and the settlement decisions of newcomers -- remains an important variable.

PB81-219388 PC **A04**/MF **A01**
Luggage and Leather Goods Manufacturers Association of America, Inc., New York.
A Diagnostic Study of the U.S. Luggage Industry.
Final rept.
Jul 81, 75p EDA-81-098
Grant EDA-99-26-07116-10
Prepared in cooperation with Economic Consulting Services Inc., Washington, DC.

The study was designed to meet three objectives: (1) develop a comprehensive profile of the U.S. luggage industry and its problems; (2) identify potential opportunities for domestic luggage producers to compete with foreign producers; and (3) evaluate the relative potential of these opportunities in strengthening the competitive position of the U.S. industry.

PB81-219453 PC **A03**/MF **A01**
Southwest Georgia Area Planning and Development Commission, Camilla.
Preliminary Economic Feasibility Analysis of Products for Indian Manufacture.
Feb 81, 50p EDA-81-096
Contract EDA-04-06-01916
Prepared in cooperation with Georgia Inst. of Tech., Atlanta. Economic Development Lab.

The major purpose of this project was to conduct a preliminary economic feasibility analysis of several products designed for manufacture by Creek Indians, a group of Creeks in southwest Georgia. The Economic Development Administration has supported aid and assistance for Native American tribes. The work will help solve two problems -- unemployment and loss of cultural heritage -- through the development of culturally-based economic enterprises. The report discusses efforts to meet the project objectives. It is divided into sections that correspond to the objectives.

PB81-219511 PC **A03**/MF **A01**
Southwest Georgia Area Planning and Development Commission, Camilla.
The Feasibility of a Honey Industry for the Lower Muscogee Creeks East of the Mississippi,
May 81, 49p EDA-81-095
Contract EDA-04-06-01916

The report is a feasibility study on the operation of a honey industry by a tribe of American Indians known as the Lower Muscogee Creeks who reside in Grady County, Georgia.

PB81-219990 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Magazine of International Trade, Volume 4, Number 13, June 29, 1981.
Biweekly pub.
29 Jun 81, 40p
See also Volume 4, Number 11, PB81-210247.
Paper copy available from Supt. of Docs.

This issue contains articles concerning market potential in the Benelux(Belgium, the Netherlands and Luxembourg); The U.S. Automotive Parts Industry; and German Trade Fairs. Also provided are sections on economic highlighs, businesses outlooks abroad, and worldwide businesses opportunities.

PB81-220485 PC **A07**/MF **A01**
National Rural Center, Austin, TX.
South Texas Rural Employment Development Project.
Final rept.
Jun 81, 129p EDA-81-097
Prepared in cooperation with the National Rural Center, Austin, TX.

The South Texas Rural Employment Development Project (STREDP) funded by the Economic Development Administration, emerged from a number of observations. One problem of concern is the absence of adequate job opportunities. A need exist to develop a project which would link economic development and human development into a comprehensive development effort. National Rural Center efforts will continue in rural communities in South Texas in the evaluation of a comprehensive development effort which brings together the available resources.

PB81-221921 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL.
Midwest Trade Adjustment Assistance Center: A Program of the Economic Development Administration.
Annual rept. 16 Sep 79-31 Jul 80,
Hiram C. Witcomb. Jun 81, 40p EDA-81-093
Grant EDA-99-26-07067-10
See also 1978-79, PB80-162076.

The Midwest TAAC was established in September 15, 1978, under authority of the Trade Act of 1974 by a grant from the EDA. The Trade Act of 1974 provides for loans and loan guarantees and technical assistance to manufacturing firms that have been adversely affected by imports. The sections of the report provide an assessment and review of the Center during its second year of operation.

PB81-222150 PC **A99**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Economic Development Administration Title I: Public Works Program Evaluation, Volume II Case Studies,
May 79, 802p
Contract EDA-T-36385
Prepared in cooperation with Centaur Associates, Inc., Washington, DC.

The general purpose of this study was to evaluate the impacts of the Title I Public Works Program of EDA. Volume II contains the individual write-ups of 109 public works projects, those randomly selected from a universe of 1,651.

PB81-222192 PC **A03**/MF **A01**
New Jersey Economic Development Authority, Trenton.
New Jersey Trade Adjustment Assistance Center.
Annual rept. 15 Sep 79-31 Aug 80.
Jun 81, 36p EDA-81-094
Grant EDA-99-26-07060-10
See also Sep 78-Sep 79, PB80-179237.

The center's primary function is to provide financial assistance to New Jersey companies in order to create a more productive labor force. The report summarizes and evaluates the Center's second year activities.

PB81-870925 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Motion Picture Industry. January, 1974-July, 1981 (Citations from the Management Contents Data Base).
Rept. for Jan 74-Jul 81.
Jul 81, 70p

This bibliography contains citations concerning the business of the motion picture industry. Upper management is discussed, and the diversification of many of the film companies is mentioned. The economics aspects of the industry, are noted, and mergers and the use of films as tax shelters are considered. (Contains 96 citations fully indexed and including a title list.)

PB81-871873 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Distribution Channels for Marketing of Consumer Goods. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 76p

A partnership in distribution between manufacturers and retailers is considered in this bibliography from global sources. Topics discussed include effective grouping of customers, products, order sizes, territories, and stability factors in industrial marketing channels. (Contains 45 citations fully indexed and including a title list.)

5D. History, Law, and Political Science

AD-A100 690/7 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Iran's Foreign Policy,
R. K. Ramazani. Mar 81, 12p FAR-30029
Prepared in cooperation with Virginia Univ.

This paper will outline five sets of questions on the current foreign policy of the revolutionary regime in Iran. These include foreign-policy decision-making; the Iraq-Iran war; Iran-Soviet relations; U.S.-Iran relations and the overall direction of Iran's foreign policy. None of these can be probed in depth here, but salient features of each will be summarized on the basis of my oral presentation to the Department on March 10.

AD-A101 147/7 PC **A11**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The United States, Vietnam, and the National Interest.
Master's thesis,
John G. Karas. Mar 81, 246p

The purpose of this thesis is to assess the interests of the United States towards Vietnam from FDR to Carter; to trace the development of U.S. policies towards Vietnam under these presidencies; to define the issues in the current relationship

between the two nations; and to set forth a strategy based on the political, economic and military needs of all the regional actors: the United States, Vietnam, China, ASEAN (Thailand, Malaysia, Singapore, Indonesia, and the Republic of the Philippines), Japan and the Soviet Union. (Author)

PB81-214975 PC **A19**/MF **A01**
Minnesota Dept. of Economic Development, St. Paul.
Minnesota Business Licensing Study: A Report to the Minnesota State Legislature,
Charles A. Schaffer. Jun 81, 429p EDA-81-091
Grant EDA-06-06-01666-40

Problems associated with state licensing regulation have been both federal and state concerns. The passage of the Environmental Coordination Procedures Act provided a statutory initiative for improved coordination of licensing and permitting and for direct service and assistance to those seeking environmental permits. Minnesota businesses and the activities of other states the Minnesota legislature recognized that a problem might exist in the number, kind, and procedures of licenses and permits necessary for the start-up, operation and expansion of a business. That recognition resulted in the passage of Chapter 246, requiring the Department of Economic Development to conduct a comprehensive study of state licenses and permits for operation of a business. The study has had four major goals. Collection, organization, identification, recommendation and development for legislative consideration of proposed statutory language to implement the recommendations made.

PB81-223315 PC **A03**/MF **A01**
Washington Univ., Seattle. Inst. for Marine Studies.
Should We Cut Our Losses. U.S. Foreign Policy and International Regimes. Donald L. McKernan Lectures in Marine Affairs, October 15-16, 1980.
Joseph S. Nye. c1981, 49p WSG-81-2, NOAA-81042905
Grant NA79AA-D-00054

The politics of the oceans have grown increasingly complex in this century and along with that complexity has come regime change. Can the United States as a great power afford to turn its back on a major ten-year effort at international regime definition. Thus, the question in the title, should we cut our losses. The author deals with this issue first in relation to the specific problems of the law of the sea regime, then explores a contrasting case--international oil--where an international regime has broken down and conference diplomacy has been suggested as a remedy. He then explores a case where a favorable but eroding regime for the nonproliferation of nuclear weapons has been bolstered by a type of conference diplomacy.

5E. Human Factors Engineering

AD-A100 767/3 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Surveys of Lighting and Working Conditions in Submarine Sonar Shacks.
Interim rept.,
Jo Ann S. Kinney, S. M. Luria, David F. Neri, Scott W. Kindess, and Christine L. Schlichting. 9 Jun 81, 13p Rept no. NSMRL-955

A survey of the physical, working conditions of twelve operating submarines was completed. The purpose was to determine the range of conditions normally encountered in sonar shacks. These conditions will next be assessed for their effects on performance and comfort so that optimum conditions can be specified. The results showed a great diversity of illumination, both in color and quantity, on the various sonar systems. Effective levels of illumination are generally considerably higher under blue light than under red. While the duty-cycle of six hours on and 12 hours off watch was standard, rotation periods during watch varied. Several conditions within the sonar shack could be changed to improve working conditions. (Author)

AD-A100 851/5 PC **A11**/MF **A01**
Dayton Univ., OH.
KC-135 Crew System Criteria.
Final rept. 5 May-1 Nov 80,
John H. Kearns, Ralph Madero, and Keith Burnette. Mar 81, 230p AFWAL-TR-81-3010
Contract F33615-79-C-3030
Prepared in cooperation with Bunker-Ramo Corp., Westlake Village CA, F33615-78-C-3614. and ORLOC, Kettering, OH. 2nd edition.

This document presents design criteria for the KC-135 Crew Systems to be developed under the KC-135 Avionics Modernization Program. It summarizes the objectives, requirements and costraints of the Strategic Air Command (SAC) (as embodied in the KC-135 Avionics Modernization Program) which have potential impact upon crew system requirements or which serve to put crew system activities in proper perspective. A methodical detailing of requirements and criteria for the crew system is presented, as well as a tracing of the logic by which they are derived from the intended mission, from the overall Weapon system and from the subsystem capabilities and needs. Additional detailing and constraints have been derived from behavioral data and pilot factors considerations elicited in experimental programs utilizing dynamic mockups, simulation and flight test. A testing procedure is described for determing degree of compliance with requirements and criteria.

5F. Humanities

PB81-217713 PC **A03**/MF **A01**
Malheur National Forest, John Day, OR.
Flag Prairie Validation Prescribed Control Burn Cultural Resource Reconnaissance.
Final rept. 20-23 Oct 80,
Grace Zilverberg. Jan 81, 47p MNF/646-81/014

To comply with Federal rules and regulations concerning protection of cultural resources on public land, a cultural resource reconnaissance was conducted over the Flag Prairie Range Validation Prescribed Control Burn project, an area of 250 acres, during October 1980. The project area is located in the Northern Great Basin of east-central Oregon. The reconnaissance resulted in the location and identification of one prehistoric and one isolated-find properties.

PB81-221269 PC **A18**/MF **A01**
Archeological Research Associates, Tulsa, OK.
Archeological Investigations at the Graham Site, 34-At-90, 1975, 1977, and 1978.
Final rept. Apr 77-Apr 81,
Charles D. Cheek, Susan Bearden, Wayne Young, C. Britt Bousman, and Steven Hackenberger. Apr 81, 409p RR-23
Contract HCRS-C3552(76)

In March of 1977, Archeological Research Associates, Tulsa, contracted with Interagency Archeological Services, National Park Service, to excavate the Graham Site, 34-At-90. This site was to be inundated by the United States Soil Conservation Service impoundment. Unfortunately, prior to completion of contracting arrangements, the impoundment was completed and the site partially flooded, which severely diminished the research potential of the site. This report discusses material excavated during earlier research at the site, which was subsequently analyzed in more detail. The main portion of the report is devoted to the integration of the information gathered by the 1978 excavations at the site with the reanalysis of the 1975 material.

PB81-928206 PC **E02**/MF **A01**
Central Intelligence Agency, Washington, DC.
China City Brief: Beijing (Peking).
Jun 81, 11p GS-81-10141
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB81-928200.

Most visitors agree that Beijing is a unique and magnetic city, a curious blend of old and new. This brief presents an overview of the city with an accompanying map, and describes its history and attractions.

5H. Man-Machine Relations

AD-A100 997/6 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Validating Manned System Design and Engineering Change Proposals,
Gerald P. Chubb, Bradley D. Purvis, and Earl D. Sharp. 1981, 8p Rept no. AFAMRL-TR-81-66
Pub. in Proceedings of the IEEE 1981 National Aerospace and Electronics Conference, p191-196 May 81.

No abstract available.

PB81-223539 PC **A15**/MF **A01**
Pittsburgh Univ., PA. Dept. of Mechanical Engineering.
Hand Tool Vibration and Vibration Energy Transmitted to the Hands of Pneumatic Chipping Hammer and Pneumatic Grinder Operators During Foundry Casting Cleaning Operations.
Contract rept. (Final),
Douglas D. Reynolds, and Richard A. Basel. 28 May 80, 350p NIOSH-210-77-0165
Contract PHS-NIOSH-210-77-0165

The transfer of acceleration and energy from vibrating tools to operator's hands was investigated. Average values of amplitude and phase of tool energy were measured in a range of 6.3 to 1000 Hertz (Hz) for 75 workers, and acceleration was measured for chipping hammers and grinders. The tool energy was below 80Hz. Acceleration of chipping hammers exceeded exposure limits proposed by the International Organization for Standardization while grinders were within those limits. The authors conclude that larger handles give lower values of displacement mobility.

5I. Personnel Selection, Training, and Evaluation

AD-A100 631/1 PC **A02**/MF **A01**
Houston Univ., TX. Dept. of Psychology.
A Model of Discipline in Organizational Settings.
Technical rept.,
Richard D. Arvey. Jun 81, 22p Rept no. TR-1
Contract N00014-80-C-0541

The report details the results of the first phase of a large scale research study investigating discipline and the effects of discipline in a large Southeastern Oil Refinery. The fifty seven interviews were conducted with hourly maintenance and operating employees. Based on these employees' descriptions of the discipline process and how it works, a preliminary model was developed. Variables associated with the employee, the disciplinary agent, the situation, and the refinery complex as a system were specified as being potentially influenced in the disciplinary process. (Author)

AD-A100 659/2 PC **A02**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Life Cycle Navy Officer Billet Costs--FY 81,
Ernest A. Koehler. Jun 81, 22p Rept no. NPRDC-TR-81-12
Supersedes Rept. no. NPRDC-SR-80-18. See also Rept. nos. NPRDC-SR-80-7 and NPRDC-80-19.

The Officer Billet Cost Model has been developed to compute the cost of manning Navy billets with officers having requisite designators and grades, in terms of investment and operating cost to the U.S. government, for each year in the life cycle of a given billet. The resulting cost data are displayed in 22 designator groups by pay grade (Ensign, 0-1, to

Captain, 0-6) and reflect the total cost of manning an established or proposed billet. (Author)

AD-A100 735/0 PC **A02**/MF **A01**
Air Command and Staff Coll., Maxwell AFB, AL.
New Training Realism for B-52 Crews.
Research rept.,
Bruce E. Eickhoff. May 81, 25p Rept no. ACSC-0780-81

Increasing defensive capabilities of potential enemies have required significant changes in the Strategic Air Command's mission and training philosophy since the mid-1970s. Specifically, the command has stepped up B -52 participation in a variety of exercises to improve readiness in both the nuclear and nonnuclear missions. The author discusses the SAC training program in some detail to show how changes in philosophy insure that the aging B-52 will be a viable weapon system during the 1980s. (Author)

AD-A100 867/1 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Effects of Presentation- and Test-Trial Training on Acquisition and Retention of Movement End-Location.
Technical rept.,
Joseph D. Hagman. Nov 80, 32p Rept no. ARI-TR-492

Three groups of 15 governmental employees performed three training trial cycles consisting of six trials each. Training methods differed in emphasis on presentation (p) and test (t) trials performed during each cycle. For one group, a cycle consisted of three p- and three t-trials administered in alternation. For another group, the first five trials of each cycle were p-trials and the sixth was a t-trial. For the last group, the first trial was a p-trial and the next five were t-trials. Group acquisition performance was compared at the last trial of each training cycle, while retention was compared 3 minutes and 24 hours after acquisition. Absolute (unsigned) error revealed that final acquisition was better when training emphasized p-trial repetition or p- and t-trial alternation within cycles. Long-term retention was better when training emphasized t-trial repetition. It was concluded that testing is an effective way to improve long-term retention of motor skill and that improvements could be realized by changing the emphasis of training from presentation to testing. This could be done without added training resource expenditures.

AD-A100 887/9 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Sociology.
Structural Change in the U.S. Army.
Final rept. 15 Jul 77-30 Sep 79,
David R. Segal. Dec 79, 10p ARI-RN-81-2
Grant DAHC19-77-G-0011
See also Rept. no. ARI-RN-79-23, AD-A079 763.

A series of theoretical and empirical analyses were undertaken to determine changes in the structure of military organization, the nature of military service, and the relationship between military organization and society since the advent of the all-volunteer force. We found that the structure of job-related attitudes among soldiers in the 1970s is similar to that among soldiers in the 1940s. The level of satisfaction, however, is lower today than it was during World War II. As was the case in World War II, black junior enlisted men today have somewhat higher job satisfaction than do white junior enlisted men. Military personnel in the all-volunteer force define what constitutes a good job much like their civilian counterparts. Thus, military service has become a job as well as a calling to many. This fact is also reflected in the attitudes that high school seniors have toward military service, with notable variations on the basis of gender and of race. Many of the traditional linkages between the military establishment and American society have been disrupted by the ending of conscription and the advent of the all-volunteer force, and there is evidence that career personnel retain few ties to the civilian community.

AD-A100 954/7 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
The FY 79 Individual Ready Reserve (IRR) Aviator Training Program.
Research rept.,
Martin F. Allnutt. Apr 80, 45p Rept no. ARI-RR-1262

This report is of the findings from a survey sent to 94 Individual Ready Reserve (IRR) aviators who trained with active Army units in the Summer of 1979 and those who trained them. The suvey covered biographical information, the manner and extent of training, the apparent skill level of the aviators and possible improvements to the training content and administration of the Program. (Author)

AD-A100 957/0 PC **A04**/MF **A01**
Advanced Research Resources Organization, Washington, DC.
First-Tour Attrition: Implications for Policy and Research.
Final technical rept.,
Barry E. Goodstadt, and Nancy C. Yedlin. Jun 80, 66p ARI-RR-1246
Contract DAHC19-77-C-0041

Current high levels of early personnel attrition are costly to the Army in terms of both recruiting and training requirements. This paper reviews state-of-the-art developments in research on attrition across the services. Past research has characterized the causes of attrition as within the individual who is discharged, in the nature of the organization's policies and practices, or different factors at different times during first enlistment. Consistent links have been found with individuals' characteristics, such as age and education, and with organizational policies. Future research should define and evaluate procedures for effective management of attrition. Specific research should be focused on areas where existing research seems to apply to policy. For example, attrition prediction tools may be applied to influence the Army's accession policies, or research findings may be utilized for developing training programs for line supervisors or may suggest ways of controlling attrition timing and tradeoffs during first enlistment. (Author)

AD-A100 958/8 PC **A04**/MF **A01**
Litton Systems, Inc., Sunnyvale, CA. Mellonics Systems Development Div.
Effects of Down-Range Feedback and the ARI Zeroing Target in Rifle Marksmanship Training.
Research rept.,
Seward Smith, Thomas J. Thompson, Keith Evans, Arthur D. Osborne, and Jeffrey L. Maxey. Jun 80, 53p ARI-RR-1251
Contract DAHC19-77-C-0011

Techniques were developed to provide knowledge of down-range rifle marksmanship results and to improve and simplify the process of zeroing the M16A1 rifle. These techniques were tested in a field experiment utilizing 2,124 basic trainees undergoing basic rifle marksmanship training at Fort Jackson, S.C. Among male trainees, those who received either the ARI Zeroing Target of Down-range Feedback training were superior in their record fire scores to trainees in the control condition. Those receiving both ARI treatments were the best of all, showing a 12.3% performance hit increase over controls. Female trainees did not show these results, but there appears to have been non-comparable samples among the four groups of women. In general, males in all groups had higher record fire scores than females. Questionnaire data revealed that trainees who received the ARI Zeroing Target training were more knowledgeable about zeroing than were controls. Overall, however, trainees demonstrated poor knowledge of many marksmanship fundamentals. These findings have been incorporated by the U.S. Army Infantry School and ARI in the development of an improved BRM training program soon to be implemented Army-wide. (Author)

AD-A100 959/6 PC **A03**/MF **A01**
Columbia Univ., New York. Teachers Coll.
Career Planning Modules for the Officer Career Information and Planning System.
Research rept.,
Susan D. Phillips, Peter C. Cairo, Roger A. Myers, Theodore G. Ryan, and Gilbert L. Hoffer. Aug 80, 42p ARI-RR-1257
Contract DAHC19-76-C-0030

The Officer Career Information and Planning System (OCIPS) is an experimental computer-aided system designed to assist in the implementation of the Officer personnel Management System. The career planning modules provide interactive dialogue units which include an introduction to career planning (FORESIGHT), information about Officer careers (OVERVIEW), data about the process of alternate specialty designation (ALTERNATE SPECIALTY), practice in self-understanding (SELF-ASSESSMENT), and an opportunity to create long-term career goals and to translate them into plans for action (CAREER STRATEGIES). The conceptual bases for the design of the modules and a preliminary test of their feasibility are described. (Author)

AD-A100 973/7 PC **A04**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Job Samples as Tank Gunnery Performance Predictors.
Technical rept.,
Newell Eaton, Jimmy R. Johnson, and Barbara A. Black. Sep 80, 67p Rept no. ARI-TR-473

This research was conducted to develop and evaluate job samples as predictors of tank gunnery performance. In Phase I of the research two potentially useful job sample predictors were identified and validated. Phase II results provided cross-validation of these predictors. Subjects in Phases I & II consisted of recent Armor OSUT graduates. Approximately one-half the subjects in Phase III were administered the job sample tests during their eight week of training while the remaining one-half were tested at the Fort Knox Reception Station, i.e., prior to training. Phase III results demonstrated that feedback had no effect on job sample-tank gunnery relationships; however, level of prior training did have an effect. Eight week personnel performed at a higher level than Reception Station personnel on most job sample tasks. Results suggest that the job samples evaluated here offer promise in predicting performance after initial training and may be adaptable for use with the operational unit assignment process. (Author)

AD-A100 974/5 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
The Effects of Repeated Engagement Simulation Exercises on Individual and Collective Performance.
Technical rept.,
Robert H. Sulzen. Aug 80, 29p Rept no. ARI-TR-485

This research measured individual and collective tactical performance in a series of engagement simulation exercises against novice opponents and with the same mission and terrain. The effects of engagement simulation training have been difficult to measure since training normally has been conducted with varying missions and terrain against a constantly improving opponent. The results of this research indicate that collective tactical performance is improved by repeated engagement simulation exercises. In the specific conditions tested, rifle squad members defending against a series of 15 rifle platoons in a movement-to-contact mission tended to suffer increased casualties when they caused more casualties. Squad members varied considerably among each other in terms of casualties produced. The squad collectively improved over time in their rate of producing enemy casualties, but did not improve in avoiding enemy fire. The squad collectively inflicted more casualties from some defensive positions than would be expected by chance. (Author)

AD-A100 975/2 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Trainee & Instructor Attitudes Toward One Station and Two Station Initial Entry Training.
Final rept. Jul 75-Aug 76,
Tomme R. Actkinson. Feb 80, 35p Rept no. ARI-RR-1243

Trainees and instructors were queried as to their attitudes toward two initial entry training strategies (IET). The two training strategies employed were One Station Unit Training (OSUT) and Two Station

Training (TST). OSUT was conducted solely at Ft. Benning, Ga. TST was conducted at two locations with the first seven weeks of training at Ft. Knox, Ky. and the last five weeks at Ft. Benning, Ga. Analysis of results showed that TST trainee attitudes improved throughout training, and that by the end of IET TST trainees had significantly more positive attitudes than did OSUT trainees. Instructor results were mixed. However, OSUT instructors indicated they felt that the length of time between cycle breaks was too long. (Author)

AD-A100 985/1 PC **A07**/MF **A01**
Human Sciences Research, Inc., Mclean, VA.
Guidance for Planning and Conduct of Field Exercises at the Maneuver Company Level. Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation.
Final rept. 1 Oct 79-30 Sep 80,
Leslie H. McFarling, Robert L. Blanton, Richard J. Seed, and Exequiel R. Sevilla, Jr. Sep 80,
126p HSR-RR-80/13-MR, ARI-RP-81-3, AD-E750 073
Contract MDA903-80-C-0106

This document provides guidance for the preparation and conduct of conventional Field Training Exercises (FTXs) at the maneuver company level. Procedures are presented on the premise that the company is participating as an organic unit in an externally evaluated battalion-level FTX. General procedures and responsibilities of individuals designated to plan, prepare for, and conduct the FTX are discussed. The role of the senior controller/evaluator in preparing control/evaluation plans and preparing for and conducting controller/evaluator training is explained in detail. A complete program of instruction for training controller/evaluators is included. The program of instruction is based on the conduct of other planning and preparation procedures described in the document. (Author)

AD-A100 986/9 PC **A02**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. Sports and the Military,
James L. Narel. Jan 80, 16p

The similarities between athletic competition and combat have been frequently cited by both military and sports figures. The labels used in one activity have become metaphors in the language of the other. But while the parallels are frequently obvious and undeniable, arguments are sometimes made that pursue the analogy into areas of questionable application. While both are physical, competitive activities, an athletic contest, however grueling or punishing, is not war; and war, obviously, is never simply a game. The feature article addresses the connection between sports and war and, more specifically, the focus on winning in each activity.

AD-A100 988/5 PC **A02**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. Values and the Professional Soldier,
James L. Narel. Mar 81, 9p

A rule of thumb governing polite conversation is to avoid topics, such as religion and politics, that deal with personal values since the resulting arguments are usually inconclusive and sometimes volatile. But that such discussions frequently bog down is not evidence that rational inquiry in this field is impossible. Reasoned analysis about personal and professional values can help us to be more rationally aware of the motives behind our actions, to identify possible inconsistencies in our moral outlook and to develop, in a gradual and systematic way, a more sophisticated work view. The feature article that begins overleaf and the events listed below offer opportunities for this kind of personal and professional growth. (Author)

AD-A100 996/8 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Extension Training Materials: Differential Perceptions Among USAREUR Lance Missile Personnel.
Research rept.,
Raymond O. Waldkoetter, and John R. Milligan. Apr 80, 33p Rept no. ARI-RR-1258

USAREUR were surveyed to determine the extent of extension training materials usage, preferred training modalities, training media mix and differential perceptions and usage of extension training materials among officer, NCO, and enlisted persons. Results indicated significant statistical differences among groups on numerous questions with definite preference and usage patterns for various extension training materials modalities. (Author)

AD-A101 114/7 PC **A06**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Precision Imagery and Audiovisual Media Maintenance Career Ladder, AFSC 404X0.
Final rept.,
Carlton F. Middleton. May 81, 122p
Occupational survey report.

This report presents the results of a detailed Air Force occupational survey of the precision imagery and Audiovisual Media Maintenance (AFS 404X0) career ladder. This occupational Survey Report (OSR) was requested by the AFSC 404X0 Training Staff Officer (TSO), Air Training Command/Technical Training (HQ ATC/TTQ). Information in this report will be used to evaluate training and to consider a possible shredout for the seemingly divergent Defense audiovisual Agency (DAVA) and Aerospace Audiovisual Service (AAVS) group at Norton AFB CA. Authority for conducting occupational surveys is contained in AFR 35-2. Computer outputs from which this report was produced are available for use by operating and training officials.

AD-A101 138/6 PC **A09**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Simulation to Analyze Pilot Workload in an Electro-Optical, Night, Low-Level Environment.
Master's thesis,
Anthony W. Groves, and Richard L. Kaercher. Mar 81, 195p Rept no. AFIT/GST/OS/81M-5

As new equipment is developed for fighter aircraft, new mission profiles are often developed. One method of evaluating the change in pilot workload associated with this new equipment is the development of a man-machine simulation that will allow workload comparisons. This thesis undertakes the development and application of such a model. The model developed and used in this study is a time sequenced network of required tasks with priority servicing by a single server. Monte Carlo techniques are used to induce a randomness into the profile to represent the variation between individual missions and pilot techniques. The major parameters in the model are the flight control service times, frequency of flight control task initiation, and the frequency of defensive reaction task initiations. The model incorporates twenty different tasks in a mission profile simulating thirty minutes of night tactical low level navigation using an electro-optical device for visual navigation and terrain following.

HRP-0029433/0 PC **A04**/MF **A01**
Illinois Univ. at the Medical Center, Chicago. Center for Educational Development.
A Survey of Interdisciplinary Programs for Health Professions Education (Academic Interaction).
Mar 78, 71p

In response to a request from the Educational Policy Committee of the University of Illinois at the Medical Center the Office of Research and Development of the Center for Educational Development has been conducting a study of Interdisciplinary Programs in Health Professions Education. Phase I of the study consisted of a literatue review prepared by Janet M. Haynes. Phase II was a survey of current programs being conducted at institutions of higher education in the United States. This paper is a report of the results of Phase II of the study.

HRP-0901827/6 PC **A05**/MF **A01**
American Association of Dental Schools, Washington, DC.
Journal of Dental Education: Manual for Development of General Practice Residency Programs in Dentistry.
Jun 79, 97p
Contract PHS-HRA-231-77-0059

This manual is designed to help institutions initiate, improve, or expand general practice residency programs in dentistry. The manual is divided into three major sections. The Introduction (Section I) reviews the historical background of general practice residency programs. Section II is entitled, 'Organization and Development of General Practice Residency Programs.' In it six areas are identified that should be considered before a new program is developed. In Section III three areas of instruction in general practice residency programs are identified. One section deals specifically with inhospital training and medical assignments. Each section begins with a brief introduction to explain the significance of the chapters. Chapters begin with a statement of objectives, so that the reader will know what should be learned from the chapter. The contents of the chapters are straight-forward descriptions of the material required for starting or improving a genral practice residency in dentistry, regardless of size, location, or history.

HRP-0903216/0 PC **A04**/MF **A01**
Orange County Health Planning Council, Tustin, CA.
Orientation and Training Plan for Participants in the Orange County Health Planning Council,
Sep 80, 63p

Training opportunities for participants in the Orange County Health Planning Council (OCHPC) are identified and formalized. The goal of the orientation program is to enable each new OCHPC participant to understand and to communicate the functions and responsibilities of OCHPC, the organization and structure of OCHPC, the roles of volunteers and staff, the history of health planning, and the major trends in the health care system. The training program builds upon the basic knowledge obtained in the orientation program and is tailored to meet the needs of the specific roles performed within the agency. Definitions, goals, objectives, and resources are provided for the orientation program and for the following training programs; the Board of Directors, Administrative Committees, Appropriateness Review Committee, Health Facilities Review Committee, Data Management Technical Advisory Group, Plan Development Committee and Planning Task Forces, Implementation Committee and Planning Task Forces, Implementation Committees and Task Forces, Community Services Committees, and Assembly of Delegates. Eight guidelines are listed for planning training sessions. Although the evaluation format will vary according to the objectives and type of training performed, a sample of a subjective evaluation form is included. The appendices include an Orientation and Education Interest Survey (checklist format) and a Meeting and Travel Authorization Form.

HRP-0903219/4 PC **A11**/MF **A01**
Washington Univ., Seattle.
Regional Dental Education Program (RDEP). Phase I Implementation Report,
Rept. for 24 Aug 79-1 Sep 80.
1 Sep 80, 228p
Contract PHS-HRA-232-79-0069
Portions of this document are not fully legible.

The prototype program represents a research effort to investigate the Regional Dental Education Program (RDEP) as an alternative to new dental school construction or dental school enlargement. This alternative involves utilizing already existing educational resources and facilities in states without dental schools to provide portions of dental education. The purpose of the present program is to demonstrate and evaluate a system of regionalized dental education.

HRP-0903220/2 PC **A02**/MF **A01**
Washington Univ., Seattle.
Prototype: Regional Dental Education Program (RDEP). Executive Summary.
Implementation rept. on phase 1, 31 Aug 79-27 Oct 80.
1980, 8p
Contract PHS-HRA-232-79-0069

The prototype Regional Dental Education Program (RDEP) represents an effort to investigate one al-

ternative to new dental school construction or dental school enlargement. This alternative involves utilizing the resources of an existing dental school (Central University) in one state in combination with existing facilities in other states (Satellite University) without dental schools. This alternative will develop a cost effective and cost competitive method of providing dental education to students from states without a dental school without increasing the total dental school enrollment. This alternative enables the provision of portions of dental education in geographic areas that are removed from a parent dental school. The purpose of this project is to demonstrate and evaluate a prototype system which can be used as a model in other locations.

HRP-0903256/6 PC **A04**/MF **A01**
Illinois Dept. of Registration and Education, Springfield.
Registered and Practical Nurse Education and Licensure.
Annual rept. 1978-79,
Martha Lee Christie, Jo Frankllin, and Elizabeth J. Cleinmark. 1979, 59p
Sponsored in part by the Bureau of Health Planning, Hyattsville, MD.

The report is based on data compiled from the 1978 and 1979 Annual Reports/Surveys submitted by all nursing education programs preparatory for RN or PN licensure which are approved by the Department of Registration and Education. Information is provided in respect to the number of nursing programs, admissions, enrollment, attrition, minority students, graduations, and nursing program faculty.

PB81-212383 PC **A02**/MF **A01**
Minnesota Dept. of Economic Development, St. Paul.
Training for Minnesota Community Development Corporations.
Final rept.
May 81, 21p EDA-81-089
Contract EDA-06-06-01657-40
Prepared in cooperation with Government Training Service, St. Paul, MN. and Minnesota Community Development Corporations.

The report summarizes the planning, implementation and evaluation of the training program. The Training program for Minnesota Community Development Corporations (CDCs) described in this report consist of two major components: (1) the development and presentation of a two-day workshop for CDC staff and governing board representatives; and (2) the development and production of a follow-up 'Resource Book'.

PB81-215840 PC **A06**/MF **A01**
Wisconsin Univ.-Madison.
Effect of Education on Drug Utilization: Executive Summary.
Final rept.,
Thomas C. Meyer. Feb 81, 109p NCHSR-81/141
Grant PHS-HS-03985

The use of several drugs in a university hospital was studied. The purpose was to determine if some educational techniques would be better than others to improve prescribing habits or if physician prescribing patterns for some types of drugs were more easily changed than their patterns for other types of drugs. Only one of the drugs studied varied from the accepted and acceptable use significantly enough to warrant educational intervention. The educational techniques used improved prescribing practices for this drug significantly. Cost/benefit could not be calculated because there were so few variations from the accepted and acceptable use criteria for the drugs studied. Possible reasons for this are discussed.

PB81-216087 PC **A04**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Violations of the Fair Labor Standards Act: Inferences from the 1979 Noncompliance Survey.
Executive summary no. 17,
Brigitte Sellekaerts, and Stephen W. Welch. 24 Mar 81, 63p

This paper presents and analyzes the findings of a statistical survey of noncompliance with the Fair Labor Standards Act in the final quarter of 1979. Its purpose was, first, the measurement of the extent and characteristics of establishment noncompliance with the FLSA and, second, the determination of the number and demographic characteristics of subject workers for whom violations were detected in the current work week.

PB81-216616 PC **A05**/MF **A01**
National Center for Education Statistics, Washington, DC.
Faculty Salaries, Tenure and Benefits, 1979-80.
Annual rept. 1979-81,
Carolyn R. Smith. Sep 80, 79p NCES-81-348

The report is based on data collected in the survey of salaries, tenure and fringe benefits of full-time instructional faculty, a component of the Higher Education General Information Survey. Conducted for the academic year 1979-80, the survey collected data on salaries, tenure and fringe benefits of full-time instructional faculty by sex, academic rank, length of contract, and level and control of institutional unit. Faculty covered were employed as of October 1 of the survey year. They were limited to members of the instruction/research staff employed on a full-time basis whose regular assignment was instruction, including those with released time for research. Excluded were pre-clinical and clinical faculty, faculty who contribute their services, faculty on other than 9- and 12-month contracts, and faculty on leave without pay. Excluded also are administrative officers such as Dean of Faculty, etc., even though they devote part of their time to classroom instruction. Undergraduate and graduate students who assist in instruction and have titles such as teaching assistant or teaching associate are also excluded. Includes tables comparing data from previous years.

PB81-216814 PC **A05**/MF **A01**
New TransCentury Foundation, Washington, DC.
Government Records: What They Tell Us About the Role of Illegal Immigrants in the Labor Market and in Income Transfer Programs,
David S. North, and Jennifer R. Wagner. Apr 81, 83p
Grant DL-21-11-80-13

It has become obvious that illegal immigrants are making substantial impacts on U.S. society, its population, its economy, and particularly on its labor market; and, while it is clear that the impacts are occuring, no consensus has been reached about the nature of those impacts nor what to do about them. It is important to try to secure incremental data from whatever sources are available on the numbers, roles, and activities of illegal migrants.

PB81-216863 PC **A05**/MF **A01**
MITRE Corp., McLean, VA.
Veterans Administration CP and E Systems Level Simulation Model Volume 1: Model Documentation.
Technical rept.,
James G. Sprung. Mar 81, 91p MTR-80W353-VOL-1
Contract V-101(134)P-571

A discrete event simulation model of the Veterans Administration Compensation, Pension, and Education System has been developed. The hardware, software, communications, files, and user commands are described as well as how they are implemented in the model. The model design methodology is described along with potential model uses. The model is designed to be sensitive to varying input workloads as well as changes to inputs about file accessing, application resource usage, and processor configurations.

PB81-216871 PC **A04**/MF **A01**
Iowa State Univ., Ames.
Employment Projections in Puerto Rico Through the 1980's: A Structural Analysis,
Final rept.,
Richard Weisskoff. Jun 81, 57p DLETA-91-19-77-31-1
Grant DL-91-19-77-31
Color illustrations reproduced in black and white.

The study traces the changes in employment in Puerto Rico from 1940 to 1980, and relates the observed changes to the economic structure and development strategy. An analysis of the changes in the farm sector from 1950 to 1978 reveals the decline of three crops (sugar cane, coffee, and tobacco) and the parallel demise of the labor intensive food crops (plantains, root crops, citrus, and legumes). The extension of the U.S. Food Stamp program to Puerto Rico in 1975 is cited as both the cause for the recent decline of native food production and as the income supporter for the inactive and unemployed. The author outlines a food self-sufficiency program for Puerto Rico based on existing studies by the U.S. Department of Agriculture.

PB81-218588 PC **A09**/MF **A01**
Derryck (Vivian Lowery), Washington, DC.
The Comparative Functionality of Formal and Non-Formal Education for Women.
Final rept.,
Vivian Lowery Derryck. Jan 79, 197p AID-PN-AAH-604
Contract AID/ort-147-78-14

With limited resources and competing priorities, development and education planners are debating which educational mode (formal or nonformal) will assure the greatest benefits to women in LDCs in terms of increased incomes, greater control over their lives, and more influence in community and familial decisionmaking. This final report presents the findings of a study to determine which educational mode is more functional for accelerating the integration of LDC women into development efforts.

PB81-219966 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Civil Servants and Contract Employees: Who Should Do What for the Federal Government.
Rept. to the Congress.
19 Jun 81, 50p FPCD-81-43

Federal agencies use contractors to do work that GAO believes Federal employees should do because the work involves basic management decisions. Although contractors may not be making final decisions, GAO is concerned about the extent to which contractors are influencing agencies' control of Federal programs and policies. Ironically, while Federal agencies use contractors for work that should be done in-house, they use Government employees to provide commercial services that contractors could provide in many cases at a lower cost. GAO recommends that the Congress and the Office of Management and Budget improve oversight and management of the Federal contract work force.

PB81-220659 PC **A04**/MF **A01**
California Univ., Davis.
Jobs for Women in Rural Industry and Services,
Ruth B. Dixon. Jul 79, 60p AID-PN-AAH-490
Contract AID/otr-147-79-52

Increasing landlessness in combination with other economic and demographic forces has created a compelling need in most developing countries for the expansion of nonagricultural employment in rural areas. Because women tend to be particularly vulnerable to displacement from land and from tranditional income-generating activities by the commercialization of agriculture for cash crops and by investment in capital-intensive industries, policies of agrarian reform and rural development will need to design support systems to: raise the productivity of labor in which rural women currently engage; transform subsistence activities into income-generating activities; and create new employment opportunities for women, particularly outside of agriculture. This paper provides new statistics on female labor in 56 countries; and proposes strategies for mobilizing rural women for employment.

PB81-220865 PC **A07**/MF **A01**
American Public Health Association, Washington, DC. International Health Programs.

Training and Use of Auxiliary Health Workers: Lessons from Developing Countries.
Doris M. Storms. 1979, 147p MONO SER-3, AID-PN-AAH-596
Contract AID/ta-C-1320

As the use of auxiliary health workers in expanding basic health services to LDC communities grows, data on effective program elements for particular settings need to be shared. This monograph draws upon contributions from knowledgeable auxiliary health workers in various LDCs and is designed for use by health planners as a practical sourcebook on ways to design, manage, and evaluate auxiliary based health services, and to plan, implement, and evaluate programs to recruit and train workers.

PB81-221004 PC **A02**/MF **A01**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
The Role of Marine Science in the Biology Classroom,
Lloyd E. Story, Jr. Oct 80, 8p MASGP-80-018, NOAA-81042914
Grant NA80AA-D-00017
Presented at the National Association of Biology Teachers Annual Convention in Boston in October, 1980. Prepared in cooperation with University of Southern Mississippi, Hattiesburg.

Curricular materials for use in secondary science classes are described. The materials are intended to be supplemental marine education materials that can be incorporated into existing secondary courses. It is invisioned that teachers will review the materials and find them interesting enough to try some or all of them in their courses at the proper time. The 'Man and the Gulf of Mexico' marine education materials will be field tested beginning with the fall term of the 1980-81 school year. There will be test centers in both states and the materials will be tested in inland as well as coastal schools. The students being exposed to the marine materials will be evaluated and statistical analyses will be determined.

PB81-221111 PC **A04**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Women in a Developing Ecomony: A West African Case Study,
Dunstan S. C. Spencer. 1979, 71p AID-PN-AAH-579
Contract AID/afr-C-1364

The role women play in the economic development process and the benefits they derive therefrom are of concern to donor agencies and policymakers. This monograph presents a case study of the role of women in the rural economy of Sierra Leone. A series of detailed surveys were conducted of both farm and non-farm households in Sierra Leone; these include sampling and recording of farm-level activities, migration patterns, fishing, small-scale industry, and the role of women in household decisionmaking.

PB81-221129 PC **A03**/MF **A01**
National Research Council, Washington, DC. Board on Science and Technology for International Development.
The Brazil Chemistry Program: An International Experiment in Science Education.
1979, 30p AID-PN-AAH-368
Contract AID/ta-C-1433

The National Research Council of Brazil and the U. S. National Academy of Sciences (USNAS) carried out a 7-year experimental program in postgraduate research and teaching in chemistry. The objectives of the program were to develop a Brazilian research capability in certain key fields of chemistry and to stimulate longterm cooperative research collaboration in chemistry between Brazilian and American scientists. In this document, the USNAS assesses the program, which proved truly cooperative both in spirit and in fact.

PB81-221145 PC **A04**/MF **A01**
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Human Labor Use in Existing and Prospective Technologies of the Semi-Arid Tropics of Peninsular India.
Progress rept.,
R. D. Ghodake, James G. Ryan, and R. Sarin. Dec 78, 73p AID-PN-AAH-421
Grant AID/ta-G-1421

Labor is a key resource in the developing world in the semiarid tropical (SAT) regions, where more than 500 million poor eke out a living. The purpose of this study was to determine the effect of newly developed land, water, and crop management technologies on existing labor patterns in a SAT region, in this case peninsular India. The performing organization based its study on six villages, detailing the use of family and hired labor by 30 farmers in each village. Topics covered in this report include labor patterns and the size of the farm, composition of labor, seasonality of labor use, regional labor patterns, and labor patterns with the introduction of watershed-based technologies.

PB81-221772 PC **A13**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Sociology.
Occupational Differentiation by Sex: An International Comparison.
Final rept. 1 Apr 78-31 Mar 80,
Katharine Alison Gaskin. 1979, 287p DLMA-91-26-78-26-F
Grant DL-91-26-78-26

Occupational segregation by sex is high in the United States, and evidence suggests that workers are sexually segregated in all industrial countries. However, no detailed cross-national comparisons of the phenomenon have been made. In this research the author has two aims. First, to compare the differentiation of women and men in detailed occupations in the United States, Canada, England, Norway, Sweden, West Germany and Italy. Reclassifying occupation data from 1960/1961 Censuses into a standard, comparable structure encompassing 86 occupations, the author estimates overall sex segregation and identifies sex-typed (sex-labeled) occupations. Second, the author explores causes of variation in occupational segregation. Within the limitations of Census data, the author explores supply-oriented and demand-oriented explanations.

PB81-222010 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Development of a Procedure for Examining Trades and Labor Applicants for Promotion to First-Line Supervisor.
Personnel research rept.,
Daniel B. Corts. Dec 80, 34p PRR-80-32

The Office of Personnel Management has developed a procedure for using a critical incident-based supervisory problems test, self-ratings of ability, and supervisory ratings of ability in ranking applicants for promotion to first-line Federal trades and labor supervisory positions. The procedure incorporates many research findings covering supervisory behavior and provides a systematic method for combining job-related information into a final score that can be used to identify the best qualified applicants. A job element analysis is used to select the most relevant subelements from a pool of 31 subelements describing the trades and labor supervisory domain. The scoring procedure provided combines the judgments of two subject matter experts serving as evaluators of all evidence of applicants' ability who know firsthand the requirements of the supervisory position to be filled.

PB81-222028 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Biographical Questionnaires and Scored Application Blanks in Personnel Selection.
Personnel research rept.,
Paul van Rijn. Dec 80, 28p PRR-80-31

The report provides a description and overview of biographical questionnaires and scored application blanks, and provides an evaluation of these procedures as potential alternatives to traditional written tests for personnel selection. A review of the literature, mostly from the private sector, shows that the biographical questionnaire has consistently proved to be one of the best single predictors for a broad spectrum of criteria and for a wide variety of jobs. However, concerns in the public sector about the job-relatedness, invasion of privacy, long-term validity, fakability, generalizability, and adverse impact of biographical questionnaires suggest that more research is needed and that their greatest potential in the public sector may be in post-employment placement rather than in personnel selection. Scored application blanks have been used extensively and successfully for personnel selection, both in the public and private sectors, and have proved to be useful selection devices. However, research is recommended to document their validity, reliability, and level of adverse impact.

PB81-222325 PC **A10**/MF **A01**
Short (John) and Associates, Salt Lake City, UT.
Manpower and Training Model for the Mining Industry.
Contract research, 1 Jun 75-Apr 80,
David Siedenstrang, Dwight Ellingwood, and John Short. Apr 80, 219p BUMINES-OFR-92-81
Contract J0357109

The report was prepared to illustrate a model for projecting employment and training demands in the coal mining industry. The report details a methodology developed to translate forecasts of regional coal production and mining productivity into estimates of training incidences necessary to meet both the MSHA safety regulations and internal skills training demands. The model is responsive to estimates of employment turnover and the job mobility of the coal mining work force as configured from a summarization of job histories of approximately 15,000 miners collected during a mine site assessment of 47 coal mining operations located thoughout the Nation. In addition, historical production, productivity, and employment data are examined for the metal and nonmetal mining industries and projections of safety related training demands are presented.

PB81-223190 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Development of Generalizable Work Behavior Categories for a Synthetic Validity Model.
Personnel research rept.,
Alice N. Outerbridge. Jan 81, 40p PRR-81-1

A study was conducted to develop a list of generalizable work behaviors for ultimate use in a modified application of Primoff's J-coefficient technique. A list of occupation-specific duties was constructed covering 24 highly populous Federal occupations, and a method was developed to inspect these duties for commonalities in terms of work behaviors. Using definitions in the Dictionary of Occupational Titles, researchers compiled a list of 223 duty statements, each of which was placed on a separate card. The duty statements were then sorted into categories describing similar work behaviors; first by a group of ten personnel psychologists and later by a group of ten occupational specialists. Nineteen sorters provided useable data. The 19 separate sorts were compared and summarized after transformation into matrix form, matrix representation allowing the development of final categories by cluster analysis as well as quantitative comparisons of sorters. Cluster analysis of the combined group categories yielded a total of 32 generalizable work behaviors.

PB81-227225 PC **A03**/MF **A01**
National Center for Education Statistics, Washington, DC.
Adult Basic and Secondary Education Recent Trends 1977-79.
Final rept. 1977-79,
Evelyn R. Kay. 9 Jul 81, 47p NCES-81-303

The report is a summary and analysis of data on adult basic and secondary education programs as reported by States for the years 1977, 1978, and 1979. Information is provided on enrollments, characteristics of participants, completions, reasons for separations, location of classes, program goals and impact, and teachers and other staff.

PB81-871998 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Educational Aspects of Business Ethics. January, 1974-July, 1981 (Citations from the Management Contents Data Base).
Rept. for Jan 74-Jul 81.
Jul 81, 42p

This bibliography contains selected citations concerning the roles of business schools and educators in fostering business ethics and the effects of education and management training upon business ethics in general and in specific situations. Consideration is given to problems and abuses which educators, institutions, and businesses must address. Some attention is also given to historical educational aspects of ethics in business. (Contains 49 citations fully indexed and including a title list.)

PB81-927911 PC **E02**
Central Intelligence Agency, Washington, DC.
Cuban Leadership.
Wall chart.
Jun 81, 23p CR-81-11989
Supersedes PB81-927910.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB81-927900.

The wallchart depicts the hierarchy of leading Cuban officials. It shows, in particular, the interlocking relationships in the Cuban power structure.

PB81-927912 PC **E02**
Central Intelligence Agency, Washington, DC.
Government of the People's Socialist Republic of Albania.
Wall chart.
May 81, 8p CR-81-10094
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB81-927900.

The report is a wall chart depicting the leadership of the government of Albania.

PB81-927913 PC **E02**
Central Intelligence Agency, Washington, DC.
Albanian Workers Party.
Wall chart.
May 81, 14p CR-81-10095
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB81-927900.

The report is a wall chart depicting the leadership of the Albanian Workers Party.

5J. Psychology (Individual and Group Behavior)

AD-A100 904/2 PC **A03**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Attention and Performance Symposium (8th), 21 August 1978, Princeton, New Jersey.
Final rept. 1 Jan 78-30 Nov 79,
R. S. Nickerson. 17 Sep 80, 43p
Contract MIPR-N00014-78-MP-80013

A symposium on Attention and Performance VIII was held on the week of 21 Aug 78 and these topics were discussed: (a) Preparatory processes and motor programming; (b) Stimulus classification and identification; (c) Measurement of attention and effort; (d) Visual information processing; (e) Language comprehension; (f) Short-term memory; (g) Semantic memory; and (h) Reasoning, problem solving, and decision processes.

AD-A100 966/1 PC **A03**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Evaluation of a Manikin Psychomotor Task.
Final rept. Jan-Oct 80,
David C. Reader, Russell A. Benel, and Alton J. Rahe. May 81, 27p Rept no. SAM-TR-81-10

A small, self-contained microprocessor displays a manikin on a TV screen in various orientations. Subjects are required to choose lateralities depending on a shape also presented on the display, and performance (accuracy and reaction time) is automatically recorded. This task has been evaluated at the USAF School of Aerospace Medicine. Data are presented to show that the task is simple to use, can be learned by all subjects, and that plateau performance can be quickly established. The various presentations were examined for difficulty; subjective and objective measures of performance were compared, and repetitive effects were sought with similarities of presentation in sequence. The analyses showed that control performance with this task was essentially constant over the experimental period. (Author)

AD-A100 993/5 MF **A01**
Duke Univ., Durham, NC. Graduate School of Business Administration.
Further tests of Aspiration Level Effects in Risky Choice Behavior.
Technical rept.,
John W. Payne, Dan J. Laughhunn, and Roy Crum. Jul 81, 22p Rept no. TR-81-1
Contract N00014-80-C-0014
Availability: Microfiche copies only.

This note extends the work on the need to incorporate a target return, reference point, or aspiration level concept in the analysis of risky choice behavior. Two experiments are reported. The first experiment provides a more complete test of the model of reference point effects previously developed. A translation of outcomes procedure, which adds a constant to all outcomes, was use to vary the relationship of pairs of gambles to an assumed target or reference point. The results fully support the model. The second experiment provides evidence of the conceptual validity of the model by using explicit instructions to vary the target levels of managers, while holding gamble values constant.

AD-A101 041/2 PC **A02**/MF **A01**
California Univ., Berkeley. Operations Research Center.
Formal versus Situational Models of Expert Decision-Making.
Final rept. 1 Apr 79-31 Mar 81,
Stuart E. Dreyfus, and Huber L. Dreyfus. Apr 81, 11p AFOSR-TR-81-0539
Contract F49620-79-C-0063

After studying the skill acquisition process of pilots, automobile drivers, nurses, chess players, musicians, foreign language learners, and business managers, we have constructed a five-stage model describing the development of their skills. Briefly, performers at the first stage of development (novices) learn to context-free features and to use strict rules to determine actions. As they accumulate enough experience to become advanced beginners, performers identify, and relate by rule, features of the situation which are no longer context-free but are recognized as similar to previously experienced features. At both of these stages, the performer treats all feature as equally important. At the third level of skill, competence, the performer learns to organize a situation by consciously choosing a goal. The choice of a goal entails that different features have different degrees of importance, thereby establishing a perspective. Decisions are chosen which further goals. After yet more experience with many concrete situation, a very important transformation occurs. On the basis of expectations and immediately preceding experience, whole situations present themselves to a perficient performer with only their salient features manifest. No longer does the performer consciously select a perspective from among alternatives. The performer chooses an action on the basis of rules operation over salient features of the manifest perspective. Finally, the expert performer has somehow stored such a wealth of experience that the appropriate action simply springs to mind.

AD-A101 108/9 PC **A05**/MF **A01**
Western Carolina Univ., Cullowhee, NC.
Task Accomplishment in an Air Force Maintenance Environment.
Final rept.,
William D. Kane, Jr. Feb 81, 80p AFOSR-TR-81-0478
Grant AFOSR-80-0146

This research investigated the impact of environmental (in the organizational sense) distractions, and the resulting coping behaviors, on maintenance performance. Prior research focused on investigating performance out of context, that is, in controlled environments. Maintenance personnel must not only achieve technical task completion, they must also contend with an environment that provides many distractions that may impede that task performance. This investigator spent one week at three different bases, one MAC, one SAC, and one TAC. He spent 107 hours observing eight different crew chiefs and nine different specialists. Because the study was designed as exploratory research the methodology precludes generalizing the results to the Air Force maintenance population. However, the methodological and conceptual problems encountered in the exploratory research are resolvable and a viable research plan to conduct a representative study is presented. The phenomenological data support the original concept and suggest that the relationship between performance and contextual variables is even more important to productivity than originally assumed. Those maintenance people observed spent fifty percent, or better, of their maintenance shift coping with environmental distractions that for the most part hindered task accomplishment. At the same time, study results suggest that there are multiple Air Force maintenance environments, rather than a monolithic maintenance environment, but the maintenance system assumes a monolithic environment.

AD-A101 153/5 PC **A04**/MF **A01**
Air Force Academy, CO.
Skills for Academic Improvement: A Guide for How-To-Study Counselors.
Interim rept. Mar-Jun 81,
Mark Nataupsky, and Nita Huelf. Jun 81, 69p
Rept no. USAFA-TR-81-6

General counseling tips are provided as background information for How-To-Study counselors. Information is presented to identify students with possible learning disabilities. There are a series of sixteen session plans to guide student counseling. Key emphasis is placed on awareness of time spent studying and time management. Other sessions focus on more specific information such as note-taking skills and test-taking strategies. Guidance is provided to determine when a student is self-sufficient and no longer needs to be in the program. (Author)

AD-A101 154/3 PC **A07**/MF **A01**
Washington Univ., Seattle. Dept. of Psychology.
Age Related Changes in Cognition during the Working Years.
Final rept. 1 Apr 79-31 May 81,
Earl Hunt, and Christopher Hertzog. 31 May 81, 128p
Contract N00014-79-C-0345

In order to alleviate present and anticipated personnel shortages, the Armed Services will have to move away from the present reliance on young adults as a source of personnel. The impact will be heaviest on the technologically oriented services, such as the Navy. Previous analyses have indicated that adults in the normal working years (20-60) can meet the physical requirements of most service occupations. Questions remain about the effects of age changes in cognition on work performance of older personnel. Changes in cognitive capacities over the adult working years are reviewed here. Two major decrements are noted; a general deterioration of sensory functioning and a slowing of higher cognitive processes. The latter slowing may be sufficient to affect performance in situations in which time demands on responding are on the order of fractions of seconds, but would probably not affect most work situations. The general effects of experience, combined with an increase in verbal intelligence throughout the working years, argues for increased competence of older individuals in many work situations. There are indications

that spatial reasoning abilities and the ability to develop solutions to new problems ('fluid intelligence') decrease with age. Secondary and review articles may overstate this effect. The primary studies themselves have serious design flaws.

PB81-212060 PC **A05**/MF **A01**
Colorado Univ. Health Sciences Center, Denver.
A Combined Developmental/Environmental Screen.
Final rept. 1 Jan 78-31 Dec 80,
William K. Frankenburg, and Cecilia E. Coons.
Jun 81, 83p MCH/CCS-81/03
Grant PHS-MC-R-080415

The goals of this project were to develop an instrument to screen a child's early home environment, and to evaluate the efficiency of a combined developmental/environmental screening procedure in identifying children who are at risk of experiencing later school problems. The project was divided into three phases. Phase I consisted of development and refinement of the Home Screening Questionnaire (HSQ). The HSQ is a parent-answered questionnaire developed from Caldwell's Home Observation for Measurement of the Environment (HOME). Phase II consisted of screening a large number of 0 to 6 year-old children using the HSQ and the Denver Developmental Screening Test (DDST). Phase III consisted of obtaining school status information for siblings of children screened as a tentative estimate of the validity of the HSQ.

PB81-222879 PC **A03**/MF **A01**
National Inst. for Personnel Research, Johannesburg (South Africa).
Electroencephalographic Assessment in Vocational Counselling.
Special rept.,
B. L. Visser. Mar 80, 50p CSIR-SR-PERS-296, ISBN-0-7988-1661-9

The report describes a study in which counselling client have been referred to EEG assessments. The connections between erratic behavior patterns and physical problems can be used by counsellors in job and living adjustment decisions.

PB81-223588 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.
Psychological Job Stress and Coronary Heart Disease.
Final rept.,
Joseph H. Chadwick, Margaret A. Chesney, George W. Black, Ray H. Rosenman, and Gunnar G. Sevelius. Nov 79, 170p
Contract CDC-99-74-42

The relationship between psychological job stress and coronary heart disease (CHD) was studied in a population of 397 male professionals of an aerospace firm. Representatives from various occupational categories, including finance and accounting, new business projects, product assurance and a comparison group were studied. Data was collected from questionnaires including job information, work and family environment scales, coronary proneness traits, personality scales, job and life stress scores and psychological distress. Information was gathered on blood pressure, serum lipid concentrations, adrenergic items, cardiovascular disease (CVD) status and medical history. Medical and cardiovascular examinations were repeated at intervals of 2.5 months for half of the study population. The workers completed weekly workload assessments and recorded their appraisals of pressure and strain. Low level relationships between psychological variables of job stress and behavior and physiological data relating to CHD risk were found. Individual characteristics and the job environment and their interactions were involved in processes that resulted in CHD risk. Variables with a strong effect on cardiovascular disease (CVD) status did not have a strong effect on physiological variables.

5K. Sociology

AD-A100 983/6 PC **A02**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. Can Ethics be Taught.
Dec 78, 12p

The degree to which cadets grow morally and forge for themselves an ethic encompassing more than the words of the Honor Code depends on their total experience, much of it well outside the ken of USMA. Within its proper limits, however, West Point asks cadets to participate fully in its special moral climate. The Academy encourages the development of mature moral beliefs by offering to cadets both required and elective courses investigating moral issues, by bringing other training and experience of cadets together so that all elements are mutually supportive, and by providing a staff and faculty attuned to the need for an Army led by officers with well-reasoned moral views. To the extent that cadet and institution succeed, the graduated cadet should possess an ethic resulting from an informed understanding of the moral implications of being a particular kind of human being--a professional officer of the U.S. Army.

AD-A100 984/4 PC **A03**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. The Noncommissioned Officer and the Professional Ethic,
Cleveland W. Feemster. Apr 79, 33p

No abstract available.

AD-A100 987/7 PC **A02**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. A Dialogue on the Law of War. Degrees of Responsibility and the Law of War. Book Reviews,
James L. Narel, Michael W. Taylor, Joel D. Miller, and Roger A. Rains. Apr 80, 20p

If ever you feel a perverse need to provoke a heated debate among military personnel, try generating a discussion about the law of war. All soldiers know that the Law of Land Warfare is a formal legal code; that adherence is not a matter of personal preference; and that violations are punishable offenses. But is the law appropriate. Is it effective. Some who would describe themselves as 'realists' maintain that combat is not an activity that lends itself to regulation and that we are being hypocritical when we profess to be guided by legal constraints. Others feel that, while the goal of limiting the suffering and destruction of war is noble, the circumstances, particularly of modern war, make application and enforcement of the laws of war impossible. What case can be made in support of such laws. Since the issue is one that lends itself naturally to debate, the dialogue format introduced in the January, 1980 edition of Ethics and the Military Profession is employed again here. The characters, Victor, Justin, and Henry-David, represent, we believe, attitudes about the law of war that are genuinely popular in the Army. Their fictitious discussion is intended to give the subject as reasonably thorough airing.

AD-A100 989/3 PC **A03**/MF **A01**
Military Academy, West Point, NY.
Ethics and the Military Profession. The Professional Ethic.
Aug 78, 29p

In this issue we are concerned with whether or not there is a professional ethic for the military. Implicit in such a discussion is the very essence of the occupation. Is the professional model the correct one, or, as many sociologists report, are we drifting aimlessly towards a more occupational mode. Presently the military is between two modes likely to move in either direction depending on future decisions about benefits and unionization and the military's own introspection in regard to its ethos. Consequently, at the moment the military finds itself in a somewhat molten condition.

HRP-0903279/8 PC **A08**/MF **A01**
Duke Univ. Medical Center, Durham, NC.
Services to the Elderly in England: Impressions from a Sabbatical,
Eva J. Salber, and Harry T. Phillips. Dec 80, 166p
Grant PHS-PE-24016
Sponsored in part by North Carolina Univ. at Chapel Hill, and Fogarty International Center, Bethesda, MD.

The present report concerns England only and is divided into ten chapters. The first chapter is a brief overview of some demographic and other data on the elderly population in England. The second chapter gives an overall picture of the national service organization, as it applies to the elderly. The subsequent seven chapters describe services in England in the following areas: geriatrics, terminal care, community nursing, personal social services, transportation, housing, and voluntary services. The final chapter presents an overview of impressions of the state-of-the-art in England of services for the elderly and a few thoughts on how the US might benefit from the English experience.

PB81-203630 PC **A13**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
The British Defenses of Yorktown, 1781, Colonial National Historical Park, Virginia.
Historic resource study,
Erwin N. Thompson. Sep 76, 289p
Portions of this document are not fully legible.

This study on the British defenses at Yorktown has been prepared in accordance with the approved planning directive for the project. The desired objective has been to complete a document that will prove useful to the needs of management, preservation, interpretation, and planning.

PB81-211831 PC **A04**/MF **A01**
Washington State Office of the Superintendent of Public Instruction, Olympia.
Creating Safer Schools,
Marilyn L. Tausend, and Jeremy A. Jones. cApr 80, 71p
Grant JF-79-66-9261-S1500

The report documents the results of a study by the state of Washington, Office of the Superintendent of Public Instruction. Contains recommendations directed at reducing vandalism and other criminal activities in schools through design and security factors (compatible with handicap regulations and life safety and health requirements). Also includes administrative and procedural recommendations. Recommendations cover site planning, building surfaces (walls, windows, etc.), specialized spaces and rooms, equipment and accessories, and school property crimes (trespassing, burglary, etc.). Contains diagrams and specific recommendations.

PB81-214306 PC **A13**/MF **A01**
Opinion Research Corp., Princeton, NJ. Caravan Surveys.
Executives' Knowledge, Attitudes and Behavior Regarding Alcoholism and Alcohol Abuse: Study 3,
Jul 76, 289p NIAAA/NCALI-81-02

Results of a personal interview research survey conducted among 536 executives drawn from a sample of the 500 largest manufacturing companies, and each of the 50 largest commercial banking, utilities, transportation, merchandising, life insurance, and diversified financial companies are reported. Respondents were interviewed during the period 6 July through 6 August 1976, concerning the number of hours in an average week devoted to their job, and were asked a series of questions dealing with their awareness of alcohol abuse and company programs for problem drinkers. Respondents were also questioned on their own personal drinking habits and current characteristics of their company.

PB81-216145 PC **A04**/MF **A01**
Administration on Aging, Washington, DC.
Annual Report to the President - 1979 of the Federal Council on the Aging, Washington, DC.
Feb 80, 52p DHEW/PUB/OHDS-79-20958

The Federal Council on the Aging was created by the Congress under provisions of the 1973 amendments to the Older Americans Act of 1965, Public Law 93-29, for the purpose of advising the President, the Secretary of the Department of Health, Education and Welfare, the Commissioner on Aging and the Congress on matters relating to the special needs of older Americans. The establish-

ment of the Council was an effort to respond to a broader range of problems affecting the elderly.

PB81-216376 PC **A06**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
A History of the Anglo Period. Tumacacori National Monument, Arizona.
Historic structure rept. 1691-1977,
A. Berle Clemensen. Sep 77, 121p FNP-560-81-36

The historical data section of the Historic Structure Report for Tumacacori National Monument concentrates on the post-1848 period and its stabilization-restoration history. There is some narrative concerning the Spanish Mission period in the Southwest which led to the construction of the church in 1802. The church was abandoned in 1848. It was occasionally used and visited by the early settlers after that year. The report includes excerpts from diaries and accounts which mention Tumacacori and describes its condition at that time. The report also discusses the movements to protect and preserve the vandalized structure which began in 1905.

PB81-216830 PC **A10**/MF **A01**
International Center for Social Gerontology, Inc., Washington, DC.
White House Conferences as Agents of Social Change: Symposium Book of Readings.
Final rept.,
Wilma T. Donahue. 1979, 225p ICSG-79/1
Grant DHEW-AOA-90-A-1799

The volume addresses: (1) the role of White House Conferences in effecting societal change; and (2) adaptations to population aging in the United States and in less developed countries (LDC's). The first paper discusses the development and objectives of White House Conferences in relation to social action. The second contribution considers impacts of population aging on developed and less developed countries with particular reference to LDC's which have 70 percent of the aggregate world population and are striving for an equitable share of the world's resources. Implications for developed economies are suggested. The third paper suggests that traditional emphasis on pursuit of affluence and consumption will give way to concern for quality of life. The essay is followed by a treatise on 'Aging in the Future' in which scenarios for societal transformation are presented: (1) a society of abundance and (2) one of scarcity. Implications are discussed for elderly income, work and retirement, health and services, housing, and uses of time. The fifth paper discusses U.S. financial outlays for the elderly in relation to levels of economic activity. The final presentation discusses socioeconomic transformations in LDC's, with particular reference to older people.

PB81-217531 PC **A06**/MF **A01**
National Inst. on Alcohol Abuse and Alcoholism, Rockville, MD.
Statistical Report: NIAAA Funded Treatment Programs, Calender Year 1979,
Donald G. Patterson, and Lorraine Ferguson. Mar 81, 121p NIAAA/NCALI-81-10
Contract PHS-ADM-281-79-0007

Information on National Institute on Alcohol Abuse and Alcoholism (NIAAA) funded alcoholism treatment facilities during Calender Year 1979 is provided. Data were collected through the National Alcoholism Program Information System (NAPIS), and are presented with respect to client caseload, client characteristics, referrals into and out of treatment, services provided to all clients, as well as selected target groups, recidivism in selected modalities, client condition changes six months after entry into treatment, staff activity, and sources of funding. Periodically throughout this report, data are presented on nonalcoholic (e.g., spouse and children) as well as alcoholic persons. Data for the American Indian/Alaskan Native (AIAN) programs that were transferred to the Indian Health Service (IHS) are not included in this report.

PB81-217549 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. Economic Development Div.
Factors Affecting Food Stamp Participation Rates and Per Capita Benefits.
Staff rept.,
Robert A. Hoppe. May 81, 25p AGESS-810409

Several socioeconomic variables had an impact on Food Stamp Program participation and per capita benefit levels in 1976. Among the significant variables were the unemployment rate, the percentage of the population that was white, the poverty rate, participation in the Aid to Families with Dependent Children Program, cashed-out Food Stamp benefits, region of residence, and metropolitan residence. Metropolitan residence increased participation and per capita benefits. This suggests that succesful approaches to administering the program in metropolitan areas may not succeed in nonmetropolitan areas.

PB81-217762 PC **A02**/MF **A01**
Administration on Aging, Washington, DC.
AOA Launches National Legal Services Effort,
Dan Fritz. Jan 76, 7p OHD-76-20115
Pub. in Aging Magazine, p1-5 Jan 76.

For the first time, a systematic national effort is taking shape to develop legal services specifically addressed to the needs of older persons. The primary thrust of this effort is 11 legal services Model Projects funded by the Administration on Aging in July, 1975. AoA's support for legal services for older persons addresses an important but long ignored need. In addition to the legal problems encountered by all citizens, the elderly face special legal problems in dealing with pensions, medical care, age discrimination, guardianship, involuntary commitment, nursing home care, and housing. They are often the main claimants for such governmental programs as Supplemental Security Income, social security, Medicare, and Medicaid. Consequently, the elderly need unique legal assistance.

PB81-217838 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Evaluation of a Vest-Pocket Park.
Forest Service research paper (Final),
Rachel Kaplan. Jun 81, 16p FSRP-NC-195

The report evaluates the effectiveness of a downtown vest-pocket park in Ann Arbor, Michigan.

PB81-217960 PC **A03**/MF **A01**
Oklahoma Univ. Health Sciences Center, Oklahoma City.
Breath-Alcohol Testing: Disposable Breath Tester.
Final rept. part 1, Sept 77-Dec 80,
Kurt M. Dubowski. Dec 80, 42p DOT-HS-805-897
Contract DOT-HS-7-01795

The report includes details of attempts to develop an inexpensive, disposable device for breath-alcohol screening tests which would be legally acceptable. It was found infeasible to develop such a device based on length-of-stain alcohol indicators. Silica gel and various other reagent carriers proved inadequate as nonreactive, nonchanneling indicator substrates. Acid potassium dichromate solution and other alcohol reagents proved insufficiently sensitive or stable for the purpose, or did not yield adequately sharp and intensive color changes. An innovative system was developed for generation of alcohol vapors with high accuracy and precision.

PB81-217978 PC **A05**/MF **A01**
Oklahoma Univ. Health Sciences Center, Oklahoma City.
Breath-Collection Device for Delayed Breath-Alcohol Analysis.
Final rept. part 2, Sep 77-Dec 80,
Kurt M. Dubowski. Dec 80, 95p DOT-HS-805-898
Contract DOT-HS-7-01795

The report includes the details of a study to develop, evaluate, and validate a breath collection device (BCD) for delayed breath-alcohol analysis. Primary applications of the BCD include collection of breath-alcohol samples for field surveys or for later laboratory analysis for independent verification of evidential breath-alcohol tests for traffic law enforcement purposes, and research uses.

PB81-217994 PC **A03**/MF **A01**
California Univ., Davis. Inst. of Governmental Affairs.
What is the TRPA. A Bureaucratic Hassle, an Eco-Sell-Out, or a Pragmatic Problem Solver,
Paul Meyer. 1974, 27p NSF-RA-E-75-077
Grants NSF-ISP73-09293, NSF-GT-39556

The Tahoe Regional Planning Agency (TRPA) was created through a bi-state compact and an act of Congress to maintain an equilibrium between the region's natural endowment and its manmade environment. It was mandated to adopt and enforce a regional plan of resource conservation and orderly development. The Lake Tahoe Basin, one of the world's most unique and beautiful environments, attracts a great many recreation seekers. In addition, the basin has a number of gambling/entertainment facilities which also draw large numbers of people. The problem has been to balance the demand of the people to visit and enjoy the area with the need to protect the environment. This report describes the organization and budget of TRPA and the creation, periodic revision, adoption, implementation, and enforcement of plans and ordinances for the development and use of the basin. Six ordinances which are now laws involve land use, tree conservation, timber harvesting, shoreline construction, grading, and subdivisions. Controversies resulting from TRPA and the agency's future direction are addressed.

PB81-218539 PC **A05**/MF **A01**
California Univ., Berkeley.
Public Evaluation of Wastewater Reuse Options,
William H. Bruvold, and James Crook. Oct 80, 85p W81-03726, OWRT/RU-80/2
Contract DI-14-34-0001-7813
Also pub. as Report. no. OWRT-R-0015(7813)(1). Prepared in cooperation with California Dept. of Health Services, Berkeley. Sanitary Engineering Section.

This research assessed how individual sociodemographic and belief variables related to personal attitudes toward reclaimed water, how 140 respondents within each of ten selected California cities ranked and evaluated specific proposed options for reuse or disposal of wastewater, and generalities in option rankings across the ten cities surveyed. Respondents were presented a detailed analysis of three wastewater treatment and reuse options for their community that covered the environmental, health and economic impacts of each option in a balanced and factual manner. Personal attitudes were assessed using a previously developed scale that dealt with the direct reuse of reclaimed water.

PB81-218711 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Land Tenure Center.
Zinacanteco Women: Prediction for Change in a Mexican Village,
Joanne Hogan, and Marta Tienda. Jan 79, 25p LTC-120, AID-PN-AAH-603
Contract AID/csd-2263-211(d)
Paper presented at the Annual Meetings of the Rural Sociological Society held at San Francisco, CA., on August 31-September 3, 1978. Also pub. as ISSN-0084-0793.

Recent studies on the changing roles of women have focused on the impact of modernization upon their traditional activity. This case study argues the thesis that the ability of the Zinacantecos (Mexican Indians) to mitigate the potentially destabilizing forces of modernization rests to some extent on how their women, who have been secluded from these forces, manage to maintain their traditional life-style.

PB81-218778 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Food Stamp Participation and Local Support.
Staff rept.,
Walter B. Epps. Feb 81, 15p AGESS-810204

Regression analysis was adopted to identify the extent of association between the level of participation in the Food Stamp Program in specified communities and the availability of local welfare services; local fiscal conditions; local levels of un-

employment; and community attitudes. All associations were positive except local attitudes.

PB81-218992 PC **A07**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Small Stone House, Roberts Farm Armstrong House, Bevins-Hellwig House, Architectural Data Delaware Water Gap National Recreation Area, NJ-PA.
Historic structure rept. 1790-1977,
Sarah M. Sweetser. Mar 77, 145p FNP-560-81-45

The three buildings included in this study are located on or near the Old Mine Road in northwestern New Jersey. The object of this report is to evaluate the maintenance priorities of the three structures.

PB81-219529 PC **A15**/MF **A01**
North Carolina Univ. at Chapel Hill. Center for Urban and Regional Studies.
Racial Discrimination in Urban Rental Housing: An Analysis of Southern Nonmetropolitan Markets with Implications for Demand Side Housing Assistance.
Doctoral thesis,
c1976, 350p NSF/RA-761619
Grant NSF-GI-33649

This doctoral dissertation analyzes the influence of racial discrimination per se on price determination and allocation processes in the southern nonmetropolitan rental housing market. It assumes that the housing market is completely structured and deals with marketplace manifestations of the collective actions of individuals. A market perspective based on housing prices and consumption levels leads to hypotheses readily amenable to systematic testing. The author presents an equilibrium theory of housing price determination which accounts for the effects of racial prejudice and preferences for segregation. These hypotheses are then subjected to rigorous statistical testing. The thesis brings together results of the analyses to examine the influence of market discrimination on improving housing conditions through market oriented strategies, a guaranteed annual income, and a housing allowance program. The analysis considers levels of housing improvement likely to be realized by blacks and whites. The major conclusion is that the rental markets studied are a weak union of two somewhat independent, racially-defined submarkets. The potential magnitude of the discriminatory effects of an allowance program is estimated.

PB81-219727 PC **A03**/MF **A01**
Wisconsin Univ.-Madison.
Women in Rural Development: A Bibliography,
Beverly Phillips. Apr 79, 50p AID-PN-AAH-331
Contract AID/csd-2263

What are the roles currently played by women in rural development. The present bibliography provides a wide range of source materials to answer this question. A first section consists of entries relating to the developing world in general. Later sections are grouped by region and include Africa, Asia, Europe, Latin America, the Near East, and the United States. Most of these materials were published in the 1970's. A large number of Spanish and some French titles appear.

PB81-219933 PC **A09**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Whiskeytown National Recreation Area, California.
Historical resource study 1848-1978,
Anna Coxe Toogood. Oct 78, 187p FNP-560-81-43

The Historic Resource Study on Whiskeytown National Recreation Area relates the development of the area due to the discovery of gold. The early growth of Shasta County, California, with the forty-niners is discussed in terms of physical growth and social development. The report describes the mining methods used as time went on as well as the mining companies which were started. The history of the area is brought through to the 20th century with the recreational attributes which attracted visitors in the 1930's.

PB81-219982 PC **A03**/MF **A01**
Carolina Archaeological Services, Columbia, SC.
A Cultural Resources Inventory Survey at Chattahoochee Forest National Fish Hatchery, Fannin County, Georgia.
Survey rept.,
Lesley M. Drucker. Oct 80, 46p

Documentary research and archaeological survey were undertaken by Carolina Archaeological Services at the Chattahoochee Forest National Fish Hatchery, Fannin County, Georgia. During the protohistoric and early historic period, this region was inhabited by Cherokee peoples, whose ancestry in the region extends at least back to approximately 1000 A.D. Prior to this time, aboriginal occupation appears to have been sparse, probably concentrating on the wider and larger river valleys. No evidence of prehistoric or historic land use prior to the early 20th century was observed or indicated during project research. A 15-acre proposed oxidation/settling lagoon area at the northern end of the hatchery property is recommended for archaeological clearance.

PB81-220071 PC **A08**/MF **A01**
University of South Florida, Tampa.
Individual, Family and Village Literacy in Development,
Edgar G. Nesman, Thomas A. Rich, and Sarah E. Green. 31 Mar 80, 163p AID-PN-AAH-530
Contract AID/DSPE-C-0040

Literacy has long been considered an important factor in promoting individual change toward more modern behavior. An individual's own literacy has traditionally been the variable investigated--with conflicting results. It has been proposed by several authors that a clearer picture of the importance of literacy to individual behavior change in peasant societies may be gained by investigating the relationship between an individual's membership in a literate group (and the amount of literacy in the group) and his tendency to change his behavior in the direction of more modern practices. It is the purpose of the current study to explore the relationships between an individual's literacy, that of his family and village and his tendency to adopt modern farm practices.

PB81-220089 PC **A03**/MF **A01**
Community Service Society of New York, NY.
Report and Recommendations of the In-Rem Housing Task Force Committee on Housing and Urban Development.
5 Mar 81, 29p

Today, the nation is in the midst of a severe crisis in rental housing. Operating costs are soaring, housing in aging, and tenants' income is not keeping pace with inflation. Owners are caught by insufficient cash flow, returns fall short of expectations, and abandonment follows. This crisis looms largest in New York City. Here, some 75 per cent of housing units are in multiple dwellings; in no other city does this figure even reach 50 per cent. As of May 1980, in rem proceedings have brought into public ownership 12,444 residential properties containing 38,910 occupied units. Rental housing--and in particular, housing for low-income and moderate-income households--holds little, if any, promise for adequate returns for the private real estate sector. Responding to the hard realities, City government has devised new ways to manage, maintain, upgrade, and dispose of housing it takes for tax arrears. This report evaluates these strategies and proposes policy directions for the future.

PB81-220774 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Land Tenure Center.
Social Change and Rural Women: Possibilities of Participation,
Shapan Adnan, and Rushidan Islam. Apr 79, 24p
LTC-137, AID-PN-AAH-601
Also pub. as ISSN-0084-0807.

The women of rural Bangladesh live in a world of both real and symbolic seclusion; they are second-class citizens because of political, economic, social, and legal bondage. The rural culture is male dominated to an extreme degree. Polygamy, seclusion (purdah), universal distrust of feminine emancipation, and flouting of the Family Law Ordinance are practiced. This report discusses the role of women in rural Bangladesh and suggests methods of improving their situation.

PB81-220808 PC **A13**/MF **A01**
National Inst. on Drug Abuse, Rockville, MD.
An Analysis of Drugs and Crime among Arrestees in the District of Columbia,
Eric D. Wish, Kandace A. Klumpp, Amy H. Moorer, Elizabeth Brady, and Kristen M. Williams. 1980, 279p
Grant LEAA-78-NI-AX-0087

The purpose of this study was (1) to construct data bases that could be used to examine the relationship between arrestee drug use and crime, and (2) to conduct initial analyses that would demonstrate the variety of issues that the completed files could be used to address. The primary objective of this research was to merge information contained in the PROMIS case-tracking system for each person arrested in the District of Columbia over a period of years with information obtained from ADASA about each arrestee's urine test results and admission to drug abuse treatment.

PB81-220832 PC **A04**/MF **A01**
Southeastern Wildlife Services, Inc., Athens, GA.
Archeological Test Excavations at 38Lu107, Rabon Creek Watershed, Laurens County, South Carolina.
Final rept. 1981,
W. Dean Wood, and Thomas H. Gresham. 15 Jan 81, 66p
Contract HCRS-A54130(80)
Sponsored in part by Soil Conservation Service, Columbia, SC. Prepared in cooperation with Heritage, Conservation and Recreation Service, Atlanta, GA. Interagency Archeological Services.

Test excavations at 38Lu107, a prehistoric, multicomponent site on South Rabon Creek in Laurens County, South Carolina, are summarized. The site is small, about 1920 square meters, and contains disturbed archeological remains to a depth of 30 cm below surface. Artifacts were recovered from Early and Middle Archaic periods as well as the Middle Woodland and Mississipian periods. The major occupation appears to have taken place during the Middle Archaic and Middle Woodland periods primarily. Features were found to be preserved below the plow zone in several areas of the site. The analysis of chipped stone tools and lithic debitage reveals that quartz predominates as the preferred raw material with various kinds of cherts and rhyolites also present.

PB81-221046 PC **A06**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Historical Data and Historic Grounds Study, George Rogers Clark National Historical Park, Indiana.
Historic structure rept. 1933-1974,
Edwin C. Bearss. Aug 77, 114p FNP-560-81-44

This report has been prepared to satisfy the research needs for rehabilitating and improving the grounds of George Rogers Clark National Historical Park. This study traces the construction and maintenance history of the memorial grounds, 1974, and an enumeration of repairs and improvements required to bring the grounds up to standards for the Bicentennial of the American Revolution.

PB81-221277 PC **A02**/MF **A01**
Harborview Medical Center, Seattle, WA.
Alternative Interventions for Sexual Assault Victims,
Karil S. Klingbeil, and Doris A. Stevens. 30 Jun 79, 16p

The researchers are developing and evaluating a systematic agency-initiated rape crisis intervention program, with particular emphasis on ameliorating coping difficulties frequently experienced by rape victims. About 100 female rape victims in a hospital emergency room are being assigned to control and experimental groups. Agency personnel contact the experimental subjects at regular intervals. All subjects are given tests and being compared on coping difficulties at 1, 6, and 12 months after the rape. This project aims at providing more effective intervention strategies in rape centers throughout the country.

PB81-221368 PC **A06**/MF **A01**
Woolworth Research Associates, White Bear Lake, MN.
A Report on the Mitigation of Impacts Upon the Beckwith Mound Group (47RI20) Gotham, Richland County, Wisconsin.
Alan R. Woolworth, and Nancy L. Woolworth.
Aug 80, 104p

This report summarizes past and present day archeological investigations conducted on the abandoned townsite of Richland City, Wisconsin (ca. 1849-1920). This village was platted on top of several prehistoric mound, village and workshop sites at the mouth of the Pine River, Richland County, southwestern Wisconsin. A historical background of the region and a chronology of the regional cultural sequence is furnished. Before destruction by farming and townsite activities, five mound groups containing at least 64 mounds, including 2 effigy mounds, stood at this location. Associated with them were several habitation areas and stone knapping sites. Erosion of the north bank of the Wisconsin River from 1872 onwards destroyed much of the townsite and the prehistoric sites on which it stood. All available evidence points to the conclusion that little of the mound group or other features have survived.

PB81-221954 PC **A11**/MF **A01**
Agency for International Development, Washington, DC.
Kenya Shelter Sector Study and AID's Experience,
N. O. Jorgensen. Aug 79, 249p AID-PN-AAH-491

In Kenya, the need for improved rural and urban housing developments has become critical. This study examines this need in three sectors of the country and is supplemented by an evaluation of A.I.D.'s experience in urban shelter, housing finance, and rural shelter.

PB81-223174 PC **A09**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Lyndon B. Johnson Birthplace-Cottage: Lyndon B. Johnson National Historic Site, Stonewall, Gillespie County, Texas.
Furnishing study 1889-1979,
Edwin C. Bearss. May 79, 191p FNP-560-81-47

The Furnishing Study of the Lyndon B. Johnson Birthplace Cottage is a two-part documented study of the relevant furnishings and houses. The first part focuses on the house built by Big Sam Johnson in 1889 and where Lyndon Baines Johnson was born on August 27, 1908, and in which he lived until September 1913. The second part of the study concentrates on the Cottage that President and Mrs. Johnson erected and furnished as a 'guest house' in 1964. The purpose of the reconstructed Birthplace is to interpret the years during which the future president, his parents, and paternal grandparents lived on this site and ranched and farmed in Stonewall.

PB81-852279 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Types and Implications of Individual Fixed-Income Retirement Plans. November, 1974-July, 1981 (Citations from the Management Contents Data Base).
Rept. for Nov 74-Jul 81.
Jul 81, 90p

The citations in this bibliography cover the pros and cons of taxing social security benefits, ensuring a secure income after retirement, fixed income 1980, income of those at age 55 or older, special tax provisions that can produce income tax savings for older clients, simplified pension plans, and fixed-income securities. (Contains 123 citations fully indexed and including a title list.)

SHR-0003862 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Counselor Education.
Working Manual of Evaluation Techniques for Primary Prevention Programs.
David B. Langmeyer. 1978, 125p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003862/ES.

The emphasis of this manual is on information - based (empirical) evaluations. Five divisions of the manual discuss assessing needs, formulating goals and objectives, defining evaluation methods, conducting the evaluation, and utilizing the results. Needs assessment strategies include primary methods, such as collecting original information from community source meetings or surveying community views. Secondary methods of needs assessment use information that has already been collected; such information comes from descriptive statistical data available from public records and public reports. The need for goals that direct program staff toward specific activities and measurements is emphasized. Most useful evaluation methods are listed. Considerations which affect the choice of measurement strategies include multiple methods for measurement, characteristics of the client population, and the need to make procedures routine. Ethical principles which must be observed in obtaining information include ensuring prior knowledge and informed consent of subjects, providing subjects with honest descriptions of the study, informing subjects in advance of all aspects of the research that bear directly on them, and keeping the subjects' data in confidence. Reliability and validity of test instruments are discussed, and evaluation designs are defined and described. Approximately 275 references are appended.

SHR-0003907 PC **A02**/MF **A01**
Pennsylvania Dept. of Public Welfare, Harrisburg. Office of Children and Youth.
Making the Almost Impossible Possible: Evaluation of Human Services.
Richard Fiene, and Earl Douglas. 1979, 20p

This article describes a model developed by the Pennsylvania Department of Public Welfare, Office of Children and Youth, Bureau of Child Development Programs, for the evaluation of its child day care programs which includes the fiscal, statistical, and programmatic components of day care programs. A manual system in 1979, it could become computerized. The Child Development Program Evaluation (CDPE) Project sought to improve the quality of care for chidren in day care in Pennsylvania by addressing 16 key components of child day care. The implementation of the CDPE has resulted in increasing day care services' compliance with regulatory standards and the upgrading of services. The model, called Ecopad (Ecological Paradigm for the Delivery and Assessment of Child Care) was designed to provide the accountability needed in the bureau of child development programs. The model integrates data across three component areas: program (services), statistical (reporting), and fiscal. Thus, Ecopad constitutes the technology built to manage the data being collected on child care programs. Schematic figures illustrate each of these three components and their interactions with each other. The report concludes that the CDPE project has shown how to develop criteria for the standardized assessment of the programmatic components of social service programs. Coordinating the fiscal and statistical components with the programmatic component permits relative objective evaluation of the total impact and cost of a social service program. Ecopad provides the model for the integration of the programmatic, fiscal, and reporting components in both a naturalistic and administratively sound manner. Footnotes and three references are provided. (Author abstract modified).

SHR-0003910 PC **A05**/MF **A01**
Pacific Consultants, Berkeley, CA.
Title XX. Comparing the Costs of Alternative Delivery Systems.
Jun 79, 81p
Contract DHEW-APS-105-77-7200
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003910/ES.

An analysis of the costs of direct versus purchased provision of homemaker / chore services in Utah is presented in terms of factors that affect the unit costs in urban and rural settings. Conducted by the Department of Health, Education, and Welfare under a contract with the Administration for Public Services, this study examines such alternative modes of service delivery as direct delivery by the government agency, public purchase delivery through another agency, and private purchase delivery through private for - profit or nonprofit organizations. To calculate and compare costs of service delivery per hour for all these alternative delivery systems in urban versus rural settings, the researchers included administrative costs, as well as the hourly wages of the homemaker staff. Based purely on homemakers' hourly wages, private service providers would appear to be cheaper, because they pay their homemakers lower wages, but when administrative and overhead expenses are taken into account, direct delivery by government agencies (despite higher salaries paid to their homemakers) appears to be more cost - effective. The necessity for further research, due to the limited number of observations on which this study is based, is emphasized. Eight tables and four graphs are included. A total of 50 references are provided.

SHR-0003981 PC **A03**/MF **A01**
New York State Board of Social Welfare, Albany.
Access by Adult Adoptees to Information and/or Reunion With Birth Parents: Towards a Public Policy Position.
Marcus Gigliotti. Jun 79, 34p

Following an examination of issues and policies regarding adult adoptees' access to information about birth parents, this report proposes a system for New York State, in which the rights of adoptees, the rights of the adoptive parents, and the rights of the birth parents would all be respected. Increasing numbers of adult adoptees are seeking more information about their genetic histories and about their birth parents. Adoptees' groups have been formed and actively encourage and assist such information searches. Under current law, original records are sealed following an adoption, and a new birth certificate is issued. While the access issue focuses on the adoptee, the other members of the adoption triangle have concerns, needs, and rights. Adoption agency problems, psychological dimensions, legal dimensions, and medical dimensions also need to be considered. Several States and Canada have some form of open access policy. Legislation in New York State should be based on the principle of respect for all parties' rights. A mediating structure is needed to balance adoptees' rights and needs with those of birth parents and adoptive parents. It is proposed that a unit be established within the State Department of Social Services to provide a statewide consulting service on adoption records. The unit would assist adult adoptees in obtaining access to their adoption records and would aid them with reunions, while balancing the rights of all involved. If adoptive parents or birth parents objected to release of information, an informal mediating process would be used to determine whether identifying information should be released. Footnotes and a description of several individual States' policies are included.

SHR-0003982 PC **A04**/MF **A01**
New York State Board of Social Welfare, Albany.
Care Network for Individuals With Disabilities, Volume II: A Description of Alternative Residential Care Models and Facilities.
May 79, 57p
Background Document for the Public Health Council.

This document attempts to provide an overview of New York State's various residential care models for individuals with disabilities, as well as of the facilities, programs, and services they incorporate. Within New York State, the human services network for individuals with disabilities includes many models of residential care. While some of these care models have a long history, others have evolved recently in response to the State's initiatives to decrease the population of disabled persons in State institutions and to preclude any further inappropriate institutionalization of individuals with disabilities. With this augmentation of care models, the complexity of the State's human service network for individuals with disabilities has significantly increased. The focus of this document is on those disabilities which so severely impair the individuals' ability to function that supervised residential care in a health, mental hygiene, or domiciliary facility is required. This category does not include the vast majority of persons with permanent disabilities who do not require such care and

reside independently, using outpatient or other community services. Following a description of the major care models and their residential alternatives, the report discusses the plans and initiatives of the Office of Mental Retardation and Developmental Disabilities and the Office of Mental Health in evolving care models and specific residential care modalities. A final section summarizes the major findings pertaining to the State's residential care network for the disabled populations considered and State policy germane to it. Tabular and grahic data and footnotes are supplied.

SHR-0003994 PC **A05**/MF **A01**
New York State Board of Social Welfare, Albany.
Appropriateness of Health Care Facilities for Individuals With Disabilities. A Report to the Public Health Council.
May 79, 76p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003994/ES.

This report contains the results of a policy study made by the New York Board of Social Welfare; the board examined the appropriateness of segregated health care facilities for individuals with disabilities. The objectives of the board's study were to outline the critical issues pertaining to the appropriateness of such facilities, research these issues, and draw conclusions regarding them. Two major issues were identified: (1) what residential care alternatives are available for individuals with disabilities within the State's human service network; and (2) what State policy positions have shaped the State's residential alternatives for the disabled and will continue to affect their future nature. The staff relied on four main sources for the study: the literature, an interagency working group of representatives of concerned State agencies, voluntary agencies and service providers, and individuals with disabilities and their families. The role of health care facilities in the long - term residential care for the disabled was found to be diminishing; furthermore, such facilities are appropriate only for a small proportion of the disabled population. On the whole, conclusions indicate that the State and voluntary associations concerned with individuals with disabilities, and the disabled themselves, view the essential criteria for residential care to be its capacity to enable the individual to reside in an environmental setting which is the most normal and as satisfying as possible. Appendices provide related materials. Tables, footnotes, and 30 references are given.

SHR-0004019 PC **A03**/MF **A01**
New Jersey State Dept. of Labor and Industry, Trenton. Div. of Vocational Rehabilitation Services.
Expansion of Services for Deaf and Hard of Hearing Clients.
Final rept.
Patricia A. Tomlinson. 1979, 42p
Innovation and Expansion Grant.

This project was conducted from January 1976 through December 1978 to increase use of and accessibility to the full range of vocational rehabilitation services by and for the deaf and hard - of - hearing population in New Jersey. Objectives were to increase the number of deaf persons served by the New Jersey Division of Vocational Rehabilitation Services (NJDVRS), to improve the quality and quantity of NJDVRS programs for deaf and hard - of - hearing programs by employing staff specialized in hearing impairment and associated communication modes, and to increase the availability of ancillary services for deaf and hard - of - hearing persons through specialized staff efforts. Staff responsibilities in the project were defined, and relevant training was provided. Four major accomplishments were realized: (1) increase in New Jersey professionals and service providers skilled in working with deaf and hard - of - hearing rehabilitation clients; (2) increase in skills and expertise of NJDVRS staff; (3) increase in the quality of services provided (evaluation, hearing aids, training, communication skills, job readiness counseling and job development, group sessions, coordination, counseling, service lists, new forms and policies, and cooperative working arrangements with the New Jersey Division of the Deaf); and (4) increase in the quantity of services provided (cases served and cases rehabilitated). Problems encountered in the course of the project pertained to New Jersey civil service regulations, the coordination of services in highly populated areas, hearing - impaired staff, hearing aid pricing, the availability and payment of interpreters, electronic data processing and coding, the naivety of service providers, and deaf consumer education regarding the vocational rehabilitation role. Plans for the continuation of project activities are discussed. Supplementary data and statistics on project results are appended.

SHR-0004093 PC **A04**/MF **A01**
Public Health Service, Rockville, MD.
Special Report on Dental Care for Handicapped People.
John D. Suomi, Merle G. McPherson, Scott McGuire, Richard Melia, and Alan Sandler. Dec 79, 65p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0004093/ES.

The dental treatment needs of the handicapped versus the dental services they receive are discussed in terms of congressionally mandated programs to expand and improve such services, and the special problems and barriers to dental care impairing the effectiveness of dental care delivery to this group. The handicapped population of the United States, numbering approximately 33 million, is known to have proportionately greater dental treatment needs and to receive less dental services than the nonhandicapped population. The cost of dental services, transportation difficulties, poor design of buildings and dental offices, and difficulties in identifying and securing a source of dental care are cited among the problems faced by the handicapped in this area. Congress has authorized several programs whereby the handicapped can receive dental services. Although data on the impact of these programs on the dental health status of the handicapped are not routinely collected, areas of weakness have been identified; these include coordination of activities relating to the oral health of the handicapped, training of dental students in the care of the handicapped, access to dental offices, special dental facilities, and access of needy handicapped adults to dental care under Medicaid. Financial remuneration of providers of dental services to the handicapped is also emphasized. Dissemination of information on available dental services to the handicapped and their families, and research and development programs in the field of dental care for the handicapped are discussed. Specific programs include the creation of a centralized system to monitor and evaluate progress being made in improving the access of handicapped persons to dental care. A bibliography listing 19 references is appended.

SHR-0004097 PC **A03**/MF **A01**
Arkansas Dept. of Human Services, Little Rock. Policy Analysis Section.
Emotionally Disturbed Youth: Implementation Work Plan.
Nov 79, 44p

This 1979 report outlines 20 tasks towards developing a treatment system for emotionally disturbed youth in Arkansas. The system provides five levels of care and allows free movement of clients from one level to another. The tasks are sequential. First, project staff must find out if existing residential treatment programs and centers can be used to care for emotionally disturbed youth, and to what extent. Concurrently, a client / management information system should be developed to provide data on all services for youth in Arkansas. Next, consistent standards should be set up for residential treatment, diagnosis, and other youth services. These standards will also document established agreements among various agencies working with children for better - coordinated services. The following step is establishing a case assessment committee and a means of reviewing youths' cases. Policies for youth advocacy and a study of current juvenile and mental commitment statutes must also be undertaken, as well as coordination of foster care and identification of all youth services and resources in the State for the information of youth mental health workers. Next, programs for moderately or acutely disturbed youth should be implemented, residential treatment for them expanded, and placement and referral begun. Final tasks will include obtaining legislative authority for service contracts with residential treatment centers, developing program monitoring techniques, and others. Task instructions and timetables are provided.

SHR-0004098 PC **A03**/MF **A01**
Arkansas Dept. of Human Services, Little Rock. Policy Analysis Section.
Evaluation Procedures Guide.
Jan 80, 43p

This collection of technical assistance handouts explains a program evaluation flow chart used in evaluating Arkansas Department of Human Services programs. The flow chart is presented and explained, and explanations of each evaluation phase and their activities follow. No evaluation study should be attempted until the program has been described with information included on legal references, program purpose, clients, staff, administration, program procedures, resources, and costs. At this point, goals and objectives for the program and the evaluation itself must be specified, along with questions outlining the measures to be used. The purposes of the study must be considered, as well as what groups will be receiving the evaluation results. Based on each question, the evaluator must determine what information is required to answer the question, where that information can be located, and how it can be retrieved. The methodology phase involves acquiring or developing any instruments necessary to gather the specified data, selection of an appropriate evaluation design and sampling plan, and development of data analysis and collection procedures with accompanying time - lines and resources required. To manage the evaluation study itself, the evaluator should specify task assignments and monitoring procedures. A methodology document outlining all planning information developed thus far is created and presented to relevant audiences. Finally, after the sample is drawn, and data are collected and analyzed, the final report is written. Charts and approximately 10 references are included.

SHR-0004406 PC **A10**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Training and Employment Services Policy Analysis: A Look at Community Based Services for Handicapped Individuals.
First year progress rept.
Claude W. Whitehead, John DeWilde, and John H. Noble. 1 Sep 79, 203p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0004406/ES.

This paper reports on an initiative to address the policies of training and employment services which affect the delivery of services to handicapped individuals in community - based sheltered workshops. The demand for special services is in contrast to the recent public policy of mainstreaming. The primary training and employment service facilities for severely handicapped persons in most communities are work activities centers, developmental centers, and other sheltered workshops. DHEW responded to studies and conferences on these workshops by initiating Training and Employment Services Policy Analysis (TESPA) to focus on the training and employment services. TESPA established a task force to identify the major issues, policy problems, and tentative action proposals. Also, TESPA will interview key personnel in six preselected States. The interviews will address the dual status of handicapped individuals in community - based sheltered workshops, financing of training and employment services, wage earnings and other income of handicapped individuals in workshops, work supply and technology, and the right of handicapped individuals to live and work independently. The working paper for the field testing and validation activity has refined major issues, policy problems, and action considerations in all of the above areas. Tables and references are included. Two appendices present a summary of the major findings and recommendations of related research and other studies, and the proceedings of the DHEW / TESPA Task Force on Current Issues and Policy Problems.

SHR-0005619 PC **A04**/MF **A01**
Children's Bureau, Washington, DC.
Families for Black Children: The Search for Adoptive Parents. Number 2: Programs and Projects.
Annie Lee Sandusky, Jane Harwood Rea, Ursula Gallagher, and Elizabeth Herzog. 1972, 73p
DHEW/OCD-72/35
See also related document, SHR-0005618.

Summary descriptions are given of 20 ongoing programs to increase the number of adoptive homes available for black children. Each summary covers the program's community involvement, active involvement of the public welfare department, interagency coordination and collaboration, and public information campaigns. The programs described are in Los Angeles, Calif., Chicago, Ill., Baltimore, Md., Massachusetts, Michigan, Minnesota, New York City, North Carolina, Ohio, Oregon, and Washington State. Each description lists the program's sponsors, names of the coordinating agencies, the staff involved, a summary of the program's activities, a discussion of problems and obstacles encountered, and an evaluation of the activities which the program has found most helpful. Where available, funding information is given. The introduction, which is basically a summary chapter, notes that, regardless of other differences in approach, each program has concentrated on involving the community in the search for adoptive homes for black children. The involvement has taken many forms: meetings with black community leaders, media campaigns, meetings with both black and nonblack community organizations, and intensive educational campaigns. The major problems facing most programs are shortages of funds and staff. Several agencies report that their major problem is the long - term placement of black children in foster care as a substitute for the release of these children for adoption. A few footnotes are included.

SHR-0005895 PC **A09**/MF **A01**
Children's Bureau, Washington, DC.
Houston Parent-Child Development Center.
Final rept.
Dale L. Johnson, Alfred J. Kahn, and Hazel Leler. Aug 76, 195p
Grant DHEW-90-C-379
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0005895/ES.

This report describes the development and evaluation of a parent education program, the Houston Parent - Child Development Center (PCDC). The program was planned in 1969, and the first groups of families entered in 1970. In all, 185 families were in program groups, with 82 families finishing the program; 188 families were in the control group, with 101 finishing. The instigation for the program was a concern for the educational future of the young child of a low-income, minority background. The PCDC project was begun on the assumption that school experience could be more productive if the child's parents could be enlisted as effective preschool teachers of the child. Families were selected through door - to - door recruitment and randomly assigned to program or control groups. Mexican - Americans were chosen as having the lowest income level, fewer years of education, and the most children under 5 in the area. Evaluation results show that parents indicated satisfaction and children were happy while participating; significant group differences favoring the program group children were obtained on both the Bayley Mental Development Index and the Stanford - Binet. The report concludes that the program has attained the immediate goals desired for participating families but that a full evaluation of its effectiveness awaits followup study of the children in school. The report discusses at length the background, development, and structure of this study, and the various testing procedures on which its results are based. There are 14 tables, 13 figures and a bibliography.

SHR-0040099 PC **A04**/MF **A01**
Society for the Study of Social Problems, Buffalo, NY.
Social Learning Theory and Sex Roles: Violence Begins in the Home.
Mildred Daley Pagelow. 1978, 60p
Annual meeting of the Society for the Study of Social Problems, September 1978, San Francisco (CA).

The kinds of evidence produced to support and generate the recent rush of publicity about the battered husband 'syndrome' are examined, followed by a brief overview of some current research on family violence and a discussion of the relationship of sex roles to male - female violence. An analysis of the studies purporting to show husband battering to be a serious social problem reveals no sound empirical evidence supporting such a contention. The most publicized study dealing with this subject, that by Suzanne Steinmetz, is flawed by the use of biased data, misinterpreted data, baseless conjecture, and the biased selection of other scholars' works. The evidence overwhelmingly indicates that woman battering is the most serious social problem issuing from prevalent male - female violence. Basing their ideas on impressive studies, social learning theorists maintain that patterns of male aggressiveness and violence and female victimization are learned by children from role models within the family. Further research is needed to determine the nature of influences that stimulate violence in male - female relationships so that effective means can be devised for the prevention, control, and elimination of physical battering in intimate relationships. Further, more and better research should be conducted into the transmission and learning of cultural norms regarding violence. Also, public education should attempt to revise sex role concepts so that males may be encouraged to view gentleness, nurturance, and empathy as behavioral ideals, while females are taught to view themselves as social equals with males rather than as passive - dependent subordinates. Tabular data, footnotes, and over 90 references are provided.

SHR-0040144 PC **A04**/MF **A01**
Minnesota Dept. of Corrections, St. Paul. Program and Services for Battered Women.
Domestic Abuse Act (Order for Protection): The 'How To' Packet.
JoAnn C. Nelson, Aviva Breen, and Bev Balos. Jan 80, 53p

In 1979, the Domestic Abuse Act of Minnesota, Chapter 214, was passed. While the act covers all victims of domestic abuse, this explanation of the act is written for shelter and advocacy persons working specifically with battered women. The law provides a civil remedy for victims of domestic abuse. This remedy is a simple process designed to obtain court - ordered reliefs from the abuser. Persons covered under the law include married couples, people who live together, and family members. Ex - spouses, former boyfriends or girlfriends, and current boyfriends or girlfriends who are not living together are not covered. The law also states that the court can issue an 'Order for Protection.' Several kinds of relief can be obtained, such as a restraining order, an award of temporary custody of children, a method of temporary support for minor children and / or spouse, and an order directing the sheriff to enforce court orders at the woman's request. The court process is explained, and major features of the law are emphasized. The document contains a copy of the actual law, pertinent definitions, and five attachments giving explanations of how to fill out various legal forms; copies of the forms are provided.

SHR-0040301 PC **A02**/MF **A01**
Center for Women Policy Studies, Washington, DC. Resource Center on Family Violence.
Annotated Bibliography on Spouse Abuse.
Jan 80, 17p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

This bibliography of 17 annotations provides a general introduction to the topic of spouse abuse. It encompasses the varied themes of victimology and victimization; the effect of the medical, legal, and criminal justice responses to women who are raped and battered; the application of the theory of 'learned helplessness' to victims of wife beating; the thesis that the causes of wife beating are built into the American social structure and its condoning of violence; and advocacy programs for abused women. The varied publications include a compilation of first - hand accounts by persons who have been brutally victimized including battered or murdered women, an article that reports a study of 20 wife assault cases, and a comprehensive book that offers specific suggestions to the battered women, to those who work with abuse victims, and to parents who wish to train children to communicate in nonviolent ways. The publications are listed alphabetically by author and were published between 1972 to 1979. Price and ordering information is included.

SHR-0040302 PC **A02**/MF **A01**
Center for Women Policy Studies, Washington, DC.
Films and Videotapes on Spouse Abuse.
Feb 80, 13p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

Twenty films and videotapes on spouse abuse are described in this handbook. The materials examine such topics as social approval of men's physical domination over women through the early common - law practice that permitted a husband to beat his wife, provided he used a switch no thicker than his thumb; the growing public and professional support and encouragement of family crisis police intervention programs; the lack of judicial protection for victims of family violence; the scope of the problem of battered wives and the kinds of women who become battered wives; and the reasons why women remain in violent homes. In addition, the films and videotapes explore the relationship of alcohol to wife battering, the cyclical nature of abuse, the treatment of domestic violence cases by the criminal justice system, and the need for further crisis centers and shelters for battered women. Each film or videotape is listed alphabetically by producer. The dates of production range from 1974 to 1980, and information is given on purchase and rental, length of showing time, and ordering.

SHR-0040303 PC **A02**/MF **A01**
National Clearinghouse on Domestic Violence, Rockville, MD.
Problem Statement: Battered Women. A National Concern.
Apr 80, 9p

Wife abuse is a major social problem. A recent national survey revealed that at least 2 million women are beaten each year by their husbands. In addition, a 1979 Louis Harris survey in Kentucky showed that 10 percent of the wives interviewed reported physical abuse during the prior 12 - month period, and 21 percent reported some violence during their marriage. Domestic violence can result in severe injury to the victim and even death. It can also endanger persons outside the family, particularly the police, and can victimize children who are either physically abused or witnesses to the abuse of their mothers. Family violence occurs in families of every economic, racial, religious, and educational group. Pregnant women are often targets of abuse. Women may choose to remain in abusive relationships for varied reasons: psychological, moral, and economic. They are often ill - prepared to support themselves; in addition, they often hope that their husbands may change. The first step in addressing the problem of wife abuse consists of recognizing that the problem exists and condemning it as wrong. Social supports, sanctions, and resources, such as shelters for battered women, are also necessary to ensure that violence by one person against another is not acceptable, either at home or in the street. Four references are provided.

SHR-0040304 PC **A03**/MF **A01**
Center for Women Policy Studies, Washington, DC. Resource Center on Family Violence.
Funding Family Violence Programs: State, Local, and Private Sources of Funds.
Jul 80, 48p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

This report discusses three major sources of funds for family violence programs: State and local governments and private sources. State and local government funds are of two types: (1) money allocated to the States by the Federal Government, and (2) funds generated at the State and local level. The report describes six programs through which formula grants, or funds transferred to State and local governments, are administered. These include the Community Service Administration, a

community action agency whose citizens determine where funding will be allocated, and the Comprehensive Employment and Training Act of 1973 (CETA) of the Department of Labor which contains a provision for women and displaced homemakers and whose funds could be applied to battered women's shelters and other women's crisis centers. Other programs are general revenue sharing, Title XX (DHEW), Community Development Block Grants (Department of Housing and Urban Development), and the Law Enforcement Assistance Administration (Department of Justice). The report also discusses two major ways in which State operating budgets could be tapped by domestic violence programs for support funding: expanding the funding of existing State agencies or obtaining State funding through legislative appropriations. Suggestions are given for obtaining funding from both local governments and private sources, including foundations, nonprofit and community organizations, corporations, and individuals. Fundraising resources are also listed. Five appendices contain a list of State governor's offices, CETA contacts, Title XX State agency directors, addresses of State planning agencies, and State legislation on domestic violence.

SHR-0040305 PC **A02**/MF **A01**
Center for Women Policy Studies, Washington, DC. Resource Center on Family Violence.
Federally Funded Projects on Domestic Violence.
Sep 80, 19p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

This paper lists Federally funded projects representing national and statewide research and demonstration efforts in the area of domestic violence. Brief descriptions of the projects, addresses, and, in some cases, names of contact persons and telephone numbers are given. Programs under the Department of Health and Human Services (HHS) include public information, technical assistance and training, and research and demonstration activities related to spouse abuse that are offered by the Office on Domestic Violence. Programs for increased delivery of services to victims of domestic violence and their families provided by the Regional Technical Assistance Centers on Family Violence are included, as are three demonstration projects that provide services to children of battered spouses and seven research projects and studies under the National Institute of Mental Health. The report also describes 20 programs sponsored by the Law Enforcement Assistance Administration (LEAA) of the Department of Justice that offer communitywide solutions to family violence. In addition, five LEAA family violence programs directed at low - income domestic violence victims and supported jointly with the Community Services Administration and four ACTION demonstration projects that emphasize the use of volunteers and prevention as an approach to family violence are listed.

SHR-0040306 PC **A02**/MF **A01**
Center for Women Policy Studies, Washington, DC. Resource Center on Family Violence.
Funding Family Violence Programs: Sources and Potential Sources for Federal Monies.
Susan Cohen. Nov 79, 23p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

This handbook lists sources of Federal funding for shelters or other support services to victims of domestic violence. Only two Federal agencies have offices dealing with domestic violence: DHEW's Office on Domestic Violence (ODV) and the Law Enforcement Assistance Administration's Family Violence Program (Department of Justice). Thirteen programs are listed under DHEW as sources for Federal monies. They include Title XX of the Social Security Act, which provides funding to the States for day care and counseling to public assistance recipients and for the prevention of child and adult abuse and neglect; Public Assistance Training Grants, which provide training in social services delivery; and the Work Incentive Program, which enables recipients of Aid to Families with Dependent Children to become economically self - sufficient. Other Federal sources of funding are listed under the Departments of Justice, Housing and Urban Development, Labor, Commerce, Treasury, Transportation, and Agriculture. In addition, programs are listed under ACTION, the Legal Services Corporation, the Appalachian Regional Commission, and the Community Services Administration.

SHR-0040307 PC **A02**/MF **A01**
Center for Women Policy Studies, Washington, DC.
Legal Help for Battered Women.
Lisa G. Lerman. Feb 80, 17p
Grants LEAA-79-TA-AX-0024, OHDS-90-CW-2189

This description of legal remedies for battered women outlines the most effective of the recent developments in the laws affecting battered women and describes some problems encountered in implementing the new laws. It lists some important differences between civil and criminal remedies and explains the following forms of civil relief that are available to battered women: protection order, temporary restraining order, peace bond, divorce or separation, child custody and visitation rights, alimony and child support, and money damages for personal injury. The kinds of abuse that can prompt these civil actions are described, as are their effectiveness, frequency of use, usual outcomes, and, for protection orders, processes for initiating and enforcing them. The handbook also lists abuses that may be prosecuted under criminal law. Criminal actions can be prosecuted if the police maie an arrest after being called for assistance, or the victim goes to the prosecutor's office or to an intake unit in criminal or family court and files a private criminal complaint. If evidence is insufficient to prosecute a case, the prosecutor can take one of several informal actions described here: warning letter, office hearing, information and referral, and meeting with the abuser. The varied ways that courts may use to dispose of charges besides trials are discussed, and it is suggested that battered women may also need other kinds of assistance including medical, counseling, and welfare or unemployment aid.

SHR-0102101 PC **A03**/MF **A01**
PROJECT SHARE (HHS), Rockville, MD.
Section 504 Resources Manual. A Guide for Small Institutions to Useful Sources, Services, and Procedures for Locating and Applying for Funds to Meet Section 504 Mandates.
Lawrence W. Marrs. Apr 81, 50p DHEW/PUB/OS-76/130
No. 19 in the Human Services Monograph Series. Prepared as a contribution to the 'Human Services Monograph Series,' Project SHARE, Department of Health and Human Services, Washington, DC.

Section 504 of the Rehabilitation Act of 1973 requires that programs receiving Federal funds allow 'otherwise qualified handicapped individual(s)' to participate in all activities. The regulation caused anxiety among administrators of human services agencies, chiefly because of the misconception that Section 504 was a barrier removal bill. This monograph dispels the misconception, provides a true picture of the bill's intent, and makes suggestions on practical, inexpensive ways of meeting the Federal requirements. However, the primary purpose of the monograph is to review the sources and services designed to aid in identifying, locating, and successfully applying for grants to comply with the Section 504 regulation. The author reviews 37 such sources and services and answers four major questions: (1) does the source or service identify appropriate sources of aid; (2) is there sufficient information about funding sources to enable one to make decisions about further investigation; (3) does the source or service supply information about eligibility, application process, etc., and does it list a contact person or agency; and (4) does it provide application guidelines and / or procedures. The strategy for responding to these major questions considers several variables, and each source or service is discussed according to a specified format. Also listed are the five levels at which financial resources may be found and tips on locating external funding. In the appendix, the author identifies other potential resources for assistance and publications on public and private sector funding and of general interest to those raising funds. Two figures are included.

6.
BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A100 657/6 PC **A02**/MF **A01**
Army Natick Research and Development Labs., MA.
Fluorometric Method for Determination of Uric Acid in Flour.
Technical rept.,
L. G. Holmes, and L. W. Smith, Jr. Jul 80, 12p
Rept no. NATICK/TR-81/003

A fluorescence technique is described for the determination of uric acid content in flour and its use as an index of insect infestation. Uric acid, a major component of the excreta of adult Tribolium used in this study for natural infestation, accumulates in infested products providing a quantitative measure of past plus present degree of infestation. The efficiency of uric acid extraction from flour with 0.2 M sodium acetate, checked by adding known amounts of uric acid to flour, is shown to be about 96-98% accurate. The method is capable of detection of uric acid at the level of 3.0 mg per 100 g of flour. (Author)

AD-A100 923/2 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Similarities and Dissimilarities between the Binding Ability of C1q and Collagen.
Final rept.,
G. Csako, Eva A. Suba, and A. Herp. 24 Oct 80, 13p Rept no. NMRI-81-24
Pub. in Clinical and Experimental Immunology, v44 p181-190 1981.

No abstract available.

AD-A100 931/5 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Rat Embryonic and Foetal Erythrocytes.
Final rept.,
John G. Gilman. 30 Jun 80, 7p Rept no. NMRI-80-78
Pub. in Biochemical Jnl., v192 p355-359 1980.

No abstract available.

AD-B055 800/7 PC **A03**/MF **A01**
Brigham Young Univ., Provo, UT. Cancer Research Center.
The Synthesis and Study of New Ribavirin Derivatives and Related Nucleoside Azole Carboxamides as Agents Active against RNA Viruses.
Annual progress rept. 1 Apr 79-31 Mar 80,
Ganapathi R. Revankar, and Roland K. Robins. Jun 80, 41p
Contract DAMD17-79-C-9046
Distribution limitation now removed.

To examine the structural parameters necessary for antiviral efficacy of certain azole carboxamide nucleosides and nucleotides, several imidazole, pyrazole and 1,2,4-triazole carboxamide nucleosides have been synthesized. New methods have been developed to prepare Ribavirin derivatives. All the compounds prepared during the subject contract have been tested at the U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick. Ribavirin 3',5'-cyclic phosphate (BJ-58536) exhibited superior in vivo activity against Venezuelan equine encephalitis (VEE) over that of ribavirin. In preliminary results on day 20 at 25 mg/kg/day of BJ-58536 there were 20 out of 20 survi-

vors in the VEE-infected mice compared to 8 out of 20 survivors in the control. (Author)

DE81023086 PC **A12**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Structural Effects on the Circular Dichroism of Ethidium-Nucleic Acid Complexes.
K. S. Dahl. Apr 81, 252p LBL-12655
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

Binding of the frameshift mutagen ethidium biomide to dinucleoside phosphates (dimers) of different base sequences was studied by optical methods, notably uv-visible spectroscopy, circular dichroism (CD), and fluorescence detected circular dichroism (FDCD). The ethidium ion intercalated between the base pairs of the minihelix formed by the complementary dimers; the stoichiometry of the complex was 2:1 dimer:dye. Equilibrium constants for complex formation showed a general preference for dye binding to complementary sequences in the order: Py(3'-5')Pu > Pu(3'-5')Pu identical to Py(3'-5')Py > Pu(3'-5')Py where Py = a pyrimidine base and Pu = a purine base. Complexes with ribodinucleoside phosphates had larger formation constants than their deoxyribo-analogues. A study of ethidium ion binding to dCA sub 5 G + dCT sub 5 G tested for any site preference of dye binding and for any correspondence between the dimer:dye FDCD spectra and oligomer:dye FDCD spectra. Ethidium ion binding and optical activity in complexes with calf thymus DNA were studied as a function of NaCl concentration. The binding constant was dependent upon salt concentration, increasing as the ionic strength decreased. The magnitude of the induced Cd band at 307 nm also increased as the ionic strength decreased. (ERA citation 06:024252)

DE81024990 PC **A11**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
X-Ray-Absorption-Spectroscopy Study of Manganese-Containing Compounds and Photosynthetic Spinach Chloroplasts.
J. A. Kirby. May 81, 235p LBL-12705
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

The manganese sites in chloroplasts, long thought to be involved in photosynthetic oxygen evolution have been examined and partially characterized by x-ray Absorption Spectroscopy (XAS) using synchrotron radiation. The local environment about the manganese atoms is estimated from an analysis of the extended X-ray Absorption Fine Structure (EXAFS). Comparisons with and simulations of the manganese EXAFS for several reference compounds leads to a model in which the chloroplast manganese atoms are contained in a binuclear complex similar to di-u-oxo-tetrakis-(2,2'-bipyridine) dimanganese. It is suggested that the partner metal is another manganese. The bridging ligands are most probably oxygen. The remaining manganese ligands are carbon, oxygen, or nitrogen. A roughly linear correlation between the X-ray K edge onset energy and the coordination charge of a large number of manganese coordination complexes and compounds has been developed. Entry of the chloroplast manganese edge energy onto this correlation diagram establishes that the active pool of manganese is in an oxidation state greater than +2. (ERA citation 06:024253)

PB81-204828
(Order as PB81-204802, PC **A05**/MF **A01**)
Academia Sinica, Beijing (China). Inst. of Biophysics.
Effect of Mg2+ on Reconstitution of H+-ATPase of Pig Heart Mitochondria into Liposomes.
Fuyu Yang, Beiqi Guo, Huang Yuguo, and Yanwu Che. 22 Oct 79, 3p
Included in Kexue Tongbao, v25 n9 p779-781 Sep 80.

In recent years the reconstitution of vesicles capable of ATP-driven energy transformation has been carried out in many laboratories, but the results are not always easily reprducible. It seems to e very important to study the optimal conditions upon which is available the incorporation of the isolated ATPase complex into artificial membranes (liposomes) in order to elucidate the structure and function of this enzyme complex. Three methods of incorporation of pig heart mitochondrial H+-ATPase into liposomes, e.e., cholate dialysis, cholate dilution and sonication, were compared in the previous work. In this paper, the effect of Mg2+ on reconstitution of pig heart mitochondrial H+-ATPase into liposomes by cholae dialysis method is reported.

6B. Bioengineering

AD-A100 806/9 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Pressure Sensing with Fiber Optics and Interferometry.
Master's thesis,
Eddie J. Preston. Dec 80, 84p Rept no. AFIT/GE/EE/81M-7

A new pressure sensing device has been analyzed, built, and tested. The device uses a Michelson interferometer to monitor pressure-induced fluctuations of a polished silicon diaphragm. Probe flexibility is achieved by mounting the diaphragm on the end of a single mode optical fiber; the coupling apparatus used permits interference to occur with the fiber in one leg of the interferometer. The phase of the resulting pattern is locked using a piezoelectric length transducer and phaselock loop control techniques. Formulas developed to model the system input/output characteristics led to the construction of a working prototype. Long term drift for the system was negligible. Short term drift limited the resolution of the system to 7 mmHg over the region 50 mmHg to 200 mmHg. The limited range resulted from the scanning limit of the piezoelectric length transducer. System linearity was approximately 5 percent. Computer noise analysis identified the high voltage DC amplifier and the piezoelectric length transducer as limiting resolution to 3 mmHg. Acousto-optic modulation was examined as an alternative control method. This approach offers better resolution and better frequency response. The performance of the prototype pressure sensing system suggests that state-of-the-art specifications could be achieved by this method. Application for intravascular blood pressure measurement is discussed. (Author)

PB81-215568 PC **A09**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.).
Systematic Studies for Improving Injury Protection in Alpine Skiing and the Concept of a New Ski-Binding System (Systematische Untersuchung zur Verbesserung des Verletzungsschutzes im Alpinen Skilauf und Konzeption eines Neuen Skibindungssystems),
Ralf Storandt. 1980, 196p
Text in German, abstract in English.

A comprehensive review is presented on contemporary ski-binding engineering. It indicates that there is room for improvement in terms of injury prevention. The factors contributing to injuries are reviewed and related to ski-binding design considerations. Use is made of injury statistics and the response of the most frequently injured parts of the body to the most frequently encountered stresses in alpine skiing. It is shown that the most important factor in ski bindings is their torque-limiting capability. The major stress occurs where the leg is 'clamped' to the ski/binding assembly. A prototype of a new ski binding is developed on the basis of these considerations. It is evaluated on the basis of laboratory and field tests. It is considered that the approach employed in designing the new binding is promising, and is also capable of further improvement. Its primary advantage is that it reduces the torsional and bending stresses for the tibia of the skier. It is also easier to adjust, which is desirable since many accidents are shown to have been caused by improper adjustment of the ski binding. The dissertation cites 27 references to the literature.

PB81-223026 PC **A06**/MF **A01**
Frankfurt Univ. (Germany, F.R.). Dept. of Nephrology.
Hemodialysis/Hemofiltration: A Comparison of Medical, Technical and Cost Factors.
Final rept. Feb 79-Jun 80,
C. A. Baldamus, and K. M. Koch. Jun 81, 110p
NIH-AM-2-8-2227-F
Contract NO1-AM-8-2227
See also report for Nov 77-Jan 79, PB-298 970.

In a hemodialysis (HD)/hemofiltration (HF) ABA cross over study clinical and laboratory parameters were followed. In patients on long term HF treatment the compatibility of HF was studied. In single patients hemodynamic changes and concomitant changes in sympathetic acitivity were investigated in regard to volume removal during pure ultrafiltration (UF), acetate HD, bicarbonate HD and HF. The claimed benefits of HF in regard to anemia, hypertension and hyperphosphatemia could not be verified. HF with low exchange volume (18-22L) seems to be an inadequate dosage of therapy and is accompanied with a decreased urea nitrogen generation rate. The main benefit of HF is the low incidence of hypotensive episodes during treatment. The costs of HF are considerably higher than of HD. No clinically adverse effects were observed in patients on long term HF treatment. UF and HF resulted in identical changes of hemodynamics and of plasma nordrenaline levels (PNA): Total peripheral vascular resistance (TRP) increased as did PNA, resulting in a stable blood pressure. In contrast during HD/TPR remained unchanged as did PNA resulting in a decrease in blood pressure. No significant differences in regard to changes in TRP and PNA were seen between acetate and bicarbonate HD.

6C. Biology

AD-A100 961/2 PC **A02**/MF **A01**
Walter Reed Army Medical Center, Washington, DC.
A Literature Review of Pupal Seta 13-CT in the Family Culicidae (Diptera) and a Report of Its Occurrence in Aedes Aurotaeniatus Edwards,
John F. Reinert. 1980, 5p
Pub. in Mosquito Systematics, v12 n4 p441-444 1980.

No abstract available.

CONF-8005164-1 PC **A03**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Expectation Values for Low Resolution Flow Slit Scan Prescreening: Influence of Nuclear Shape and DNA Density.
P. F. Mullaney, R. Mann, G. Seger, and M. Achatz. 1981, 26p
Contract W-7405-ENG-48
International conference on automation of diagnostic cytology and cell image analysis, Munich, F.R. Germany, 23 May 1980.

High resolution fluorescent image analysis has been conducted with mithramycin stained cells from clinical gynecological specimens. Features characteristic of the usual, low resolution, one dimensional slit-scan flow cytometric measurements were extracted from 250 high resolution nuclear images. In addition to the measurement of the usual parameters, nuclear ellipticity and DNA density (DNA per unit nuclear size) were also determined. Preliminary results indicate both these features offer increased discrimination. When nuclear shape is included as a global feature, at least 77% of the diagnostic cells can be distinguished from normals, with no overlap. Both features hold promise for improving the discrimination possible with flow cytometry. (ERA citation 06:022630)

DE81024391 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Germination Characteristics of Six Plant Species Growing on the Hanford Site.
G. R. Cox, R. R. Kirkham, and J. F. Cline. Mar 80, 13p RHO-LD-121

Contract AC06-77RL01030
Microfiche only after original copies are exhausted.

Six plant species (Siberian and thickspike wheatgrass, cheatgrass, sand dropseed, Indian ricegrass, and Russian thistle) found on the Hanford Site were studied as part of an investigation into the revegetation of disturbed areas. Germination response to three environmental parameters (soil moisture, soil temperature, and planting depth) were measured. Results indicated that when a polyethylene glycol solution was used to control the osmotic potential of the imbibition media, no significant decrease in germination rate occurred down to -3.0 bars. However, below -7.0 bars all species experienced a decrease in germination. When germinated in soil, all species except Russian thistle exhibited a significant decrease in germination rate at -0.3 bars. Russian thistle was the only species tested that exhibited germination at a soil temperature of 1 exp 0 C. All species gave optimum germination at temperatures between 10 and 15 exp 0 C. Thickspike wheatgrass was the only species tested which was able to germinate and emerge from a planting depth of greater than 2 inches. If supplemental moisture is provided, a shallow planting would be advisable for those species tested. If not overcome by pretreatment prior to planting, seed dormancy may be a significant factor which will reduce the germination potential of some species tested. (ERA citation 06:024186)

DOE/EV/02040-T1 PC **A02**/MF **A01**
Chicago Univ., IL.
Use of Lymphoblastoid Cells for the Estimation of Environmental Insults to DNA. Comprehensive Report of the Overall Activities of the Contract During the past Three Years. Progress Report, August 1, 1978-June 31, 1981.
1981, 8p
Contract AS02-76EV02040

Research progress is reported on a study to detect chronic low-level exposure of individuals to polycyclic aromatic hydrocarbons by analysis of DNA in cells with low turnover rates. The technique used was to measure the level of excision repair activity in lymphoblastoid and lymphoma cell lines. (ERA citation 06:022704)

DOE/EV/02311-32 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Microbiology, Cell Biology, Biochemistry and Biophysics.
Membrane-Membrane Interactions in a Lipid-Containing Bacteriophage System. Progress Report, October 1, 1980-September 30, 1981.
W. Snipes. May 81, 8p
Contract AS02-76EV02311

Virus-cell interactions and the mechanism of viral entry have been the major focal points of this research. A method of analysis was perfected to investigate the entry process for herpes simplex virus. This technique makes use of a photosensitizing dye, FITC, that covalently binds to viral envelope proteins. Treated virions remain photosensitive until the envelope is shed during the process of infection. Our data strongly support an entry mechanism in which the viral envelope fuses with the cell plasma membrane. Other related projects have involved studies of the virucidal properties of retinoids, plaque development characteristics for viruses surviving treatment with membrane perturbers, and a large plaque effect that occurs when virus are plated on cells pretreated with uv light. In addition, we have characterized a new bacteriophage, investigated the interactions of divalent cations and proteins with phospholipid vesicles, extended our studies of the effects of hydrophobic photosensitizers on cell membranes, and used the spin-trapping technique to elucidate the reaction mechanism for an enzyme-like activity in soil extracts. (ERA citation 06:024260)

DOE/EV/02472-T1 PC **A02**/MF **A01**
Harvard Univ., Cambridge, MA. Museum of Comparative Zoology.
Study of Mathematical Models of Mutation and Selection in Multi-Locus Systems. Annual Progress Report, October 1, 1980-September 30, 1981.
R. C. Lewontin. 1981, 12p COO-2472-07
Contract AS02-76EV02472

During the past year, research has been devoted to two related studies of two-locus systems under natural selection and one on selection in haplo-diploid organisms. The principal results are: (1) Numerical studies were made of 2 locus selection models with asymmetric fitnesses. These were created by perturbing the fitness matrices of symmetric models whose results are known analytically. A complete classification of solved models has been made and all perturbations of these have been undertaken. The result is that all models lead to three classes of equilibrium structure. All are characterized by multiple equilbria with small linkage disequilibria under loose linkage and high complementarity equilibria under tight linkage. In some cases there is gene fixation at intermediate linkage. (2) It has been shown that selection may favor more recombination, contrary to the usual expectation, if multiple locus polymorphisms are maintained by a mechanism other than marginal overdominance. This may be the result of mutation-selection balance or frequency-dependent selection. (3) In a haplo-diploid system in which diploid males are lethal (as in bees and braconid wasps) the number of sex alleles that can be maintained depends both on breeding size and the number of colonies. Simulations show that the steady number is sensitive to the number of colonies but insensitive to the number of matings. Thirty-five to fifty colonies are sufficient to maintain very large numbers of sex alleles. (ERA citation 06:022637)

DOE/EV/02502-19 PC **A03**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Biology.
Integrative Studies of Thermoregulation in Ectothermic Vertebrates in Aquatic Habitats. Annual Progress Report, 1 October 1980-30 September 1981.
J. R. Spotila. May 81, 27p
Contract AS02-76EV02502

Field experiments are underway to determine the behavioral mechanisms by which largemouth bass, Micropterus salmoides, respond to rapid temperature changes in their natural environment. Laboratory experiments are clarifying the relationship between basking behavior of the turtle, Pseudemys scripta and its nutritional state. Important progress has been made in the development and miniaturization of a multichannel, temperature sensing, radio transmitter for fish. Theoretical analysis and mathematical modeling have defined the realized and fundamental climate space of P. scripta and allows the prediction of the behavior of this turtle. (ERA citation 06:024363)

PB81-212995 PC **A22**/MF **A01**
Smithsonian Institution, Washington, DC.
A Revised Handbook to the Flora of Ceylon. Volume II.
c1981, 522p TT-78-52029/02
Trans. of Sri Lanka Jnl. See also Volume 1, PB80-184591. Sponsored in part by Sri Lanka Univ., Peradeniya.

It is hoped that this new Handbook will stimulate active interest in the plant resources of Ceylon. Above all, it is hoped that this interest will bring about the establishment of more national parks and nature reserves in all parts of Ceylon, in order that the remarkable Ceylon flora may still have a suitable range of habitats in which to live. By this means, only the species will be able to survive for the use and pleasure of many future generations of Ceylonese and of visitors from other parts of the world. Without a great increase in such reserves, at the present rate of deforestation and bringing land under agriculture, very many species will surely become extinct in the near future, as some probably already have.

PB81-214215 PC **A06**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India). Publications and Information Directorate.
Medicinal and Aromatic Plants Abstracts. Volume 3, Number 1, February 1981.
Bi-monthly rept.
c1981, 125p
See also Volume 2, Number 6, PB81-150609. Also pub. as ISSN-0250-4367.

Contents: Agronomy; Botany(General and systematic); Breeding and genetics; Diseases and pests; Physiology and biochemistry; Pharmacognosy; Clinical studies; Pharmacology and toxicology; Antimicrobial activity; Insecticidal and piscicidal activities; Phytochemistry; Chemotaxonomy; Ethnomedicine; and Analytical and processing techniques.

PB81-215055 PC **A06**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India). Publications and Information Directorate.
Medicinal and Aromatic Plants Abstracts. Volume 3, Number 2, April 1981.
Bi-monthly rept.
c1981, 114p
See also Volume 2, Number 6, PB81-150609. Also pub. as ISSN-0250-4367.

Contents: Agronomy; Botany(General and systematic); Breeding and genetics; Diseases and pests; Physiology and biochemistry; Pharmacognosy; Clinical studies; Pharmacology and toxicology; Antimicrobial activities; Insecticidal and piscicidal; Activities; Phytochemistry; Chemotaxonomy; Ethnomedicine; Analytical and processing; and Techniques.

PB81-217119 PC **A05**/MF **A01**
Combs (Earl R.), Inc., Kodiak, AK.
System Strategy to Support Fisheries Development in Alaska. Technical Appendix.
Jun 81, 89p EDA-81-087
Grant EDA-07-6-02271
See also report dated Nov 80, PB81-116022.

This technical appendix supplements the information provided in the report entitled System Strategy to Support Fisheries Development in Alaska. The appendix is designed to present the project planning methodology for that report in a detailed manner.

PB81-218349 PC **A09**/MF **A01**
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
Water Temperature Dynamics in Experimental Field Channels: Analysis and Modeling,
Heinz G. Stefan, John Gulliver, Alex Y. Fu, and Michael G. Hahn. Feb 81, 191p EPA-600/3-81-008
Grants EPA-R-803686, EPA-R-804736

This study is on water temperature dynamics in the shallow field channels of the USEPA Monticello Ecological Research Station (MERS). The hydraulic and temperature environment in the MERS channels was measured and simulated to provide some background for several biological studies at the Research Station, including one of the effects of artificially high water temperatures on fish and invertebrate populations. An analysis of the temperature measurement problem, the channel temperature regime, microhabitat conditions, and temporal and spatial water temperature dynamics was essential for the investigation.

PB81-220691 PC **A02**
Wisconsin Univ.-Madison. Sea Grant Coll. Program.
Grazing Interactions Among Freshwater Calanoid Copepods,
Sumner Richman, Scott A. Bohon, and Stephen E. Robbins. c1980, 18p WIS-SG-81-724, NOAA-81042902
Pub. in Evolution and Ecology of Zooplankton Communities, p219-233 1980.

A comparative study was carried out on the grazing interactions of four calanoid copepod species feeding on natural phytoplankton assemblages in southern Green Bay and Lake Winnebago and on algal species used singly and in mixtures. The species studied were Diaptomus siciloides, Diaptomus oregonenis, Diaptomus ashlandi, and Eurytemora affinis. Particle distributions before and after feeding were analyzed using a model B Coulter Counter interfaced to a PDP 11/20 laboratory computer, which allowed for automated analyses of particles in 128 size categories. Comparisons of the four calanoid copepods revealed both similarities and differences in their feeding behavior. (Copyright (c) 1980 by Trustees of Dartmouth College.)

PB81-220931 PC **A03**/MF **A01**
Washington Univ., Seattle. Div. of Marine Resources.
Black Cod--Boom or Bust. Proceedings of a Seminar Held in Seattle, Washington on February 27, 1980,
Charlotte Henry. Mar 80, 33p WSG/WO-81-1, NOAA-81042906
Grant NA79AA-D-00054

Rising interest in the black cod fishery and escalating prices for black cod in 1979 led many people to inquire about this fishery as an alternative to more traditional fisheries. In response to these inquiries, the National Marine Fisheries Service and Washington Sea Grant sponsored an all day seminar in Seattle on February 27, 1980. Pooling the resources of the NMFS specialists and others, this seminar focused on the experience and knowledge of those involved in the black cod fishery.

PB81-221038 PC **A02**/MF **A01**
Washington Univ., Seattle. Div. of Marine Resources.
Commercial Fish Landings, Washington State Ports 1971-1979.
Technical rept.,
Terry Nosho, Roland Tomokiyo, and Dale Ward. Dec 80, 25p WSG-80-4, NOAA-81042908

The Sea Grant Program advisory service function is to develop technical information in a form useful to the public. This publication provides interested groups and individuals with a perspective of the commercial fisheries in Washington and indicates the relative importance of Washington's fishery ports of landing over time. Data on commercial fish landing in Washington State ports from 1971 through 1979 are presented in order to provide an overview of the State's commercial fisheries as well as a comparison of fishery port landings during this period.

PB81-221236 PC **A03**/MF **A01**
Washington Univ., Seattle. Div. of Marine Resources.
Fishing Piers - Their Design, Operation, and Use,
Raymond M. Buckley, and James M. Walton. Feb 81, 33p WSG-81-1, NOAA-81042907
Grant NA79AA-D-00054
Prepared in cooperation with Washington State Dept. of Fisheries, Seattle.

The development of a comprehensive fishing pier management strategy, encompassing such divergent concerns as structural designs, angler desires, and fishery harvest rates, is a relatively new concept in fisheries management. The Washington Department of Fisheries is making a substantial investment in establishing a number of public recreational piers with habitat enhancement structures to provide shoreline anglers in metropolitan areas with access to marine resources. Information and ideas on meeting these requirements were obtained by a survey of fishing pier facilities in Florida, California, Texas, and Washington.

PB81-225567 PC **A02**
Washington State Univ., Pullman. Dept. of Plant Pathology.
Localization of Fungal Components in the Pea-Fusarium Interaction Detected Immunochemically with Anti-chitosan and Anti-fungal Cell Wall Antisera,
Lee A. Hadwiger, Jean M. Beckman, and Michael J. Adams. 1981, 7p NOAA-81050804
Also pub. as Washington State Univ., Pullman. Coll. of Agriculture Research Center Scientific Paper No. 5639. Pub. in Plant Physiology, v67 p170-175 1981.

Antisera specific for purified cell walls of Fusarium solani f. sp. pisi and phaseoli and of shrimp shell chitosan were utilized as immunochemical probes to determine the location of fungal components in the pea-Fusarium interaction. Within 15 minutes after inoculation, fungal cell wall components appear to enter the plant cell and to accumulate inside the plant cell wall as fungal growth on the plant tissue is inhibited. The accumulation patterns of chitosan and all components containing hexosamine polymers resembled those of the fungal wall components. Chitosan is present on, and is released from, the outer surface of the fungal spore. Within 15 minutes after applying (3H) chitosan to the surface of the plant tissue, the label is readily detectable within the plant cytoplasm and conspicuously detectable within the plant nucleus. It is proposed that the potential for transport of chitosan between the spores of Fusarium solani and pea cells, in addition to its potential to inhibit fungal growth and elicit disease resistance responses, suggests chitosan has a major regulatory role in this host-parasite interaction.

UR-3490/LCP-22 PC **A10**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Analysis of Cells Isolated from Bone Cultured on Collagen Gels and Polystyrene Culture Dishes.
K. Fletcher. 1981, 225p
Contract AC02-76EV03490

Bone is a complex tissue which contains three types of differentiated cells viz., osteoblasts, osteoclasts and osteocytes. In mature bone, these cells are identified both by their location within the tissue and their morphological characteristics. In fetal tissue, one also finds many progenitor cells, fibroblasts and some cartilage cells. Each of these cell types has distinct functions which are reflected in their morphology, metabolic properties and response to hormones. Studies were also undertaken to evaluate the class of problems associated with electron microprobe analysis of the extracellular fluid space in bone. It was determined that differences in elemental composition in a small volume between cells and mineral cannot be quantitatively corrected for fluorescence, atomic number or absorption effects of the mineral. A study of the use of free-flow dialysis in the study of metal binding to protein demonstrates the anomalous behavior of mercury in this experimental approach and emphasizes the importance of a thorough examination of the control situation before protein to metal binding is examined. (ERA citation 06:022631)

6D. Bionics

AD-A100 639/4 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
A Medium-Range Vision Aid for the Blind,
M. D. Altschuler, J. L. Posdamer, G. Frieder, M. J. Manthey, and B. R. Altschuler. 1980, 5p Rept no. SAM-TR-80-253
DARPA Order-3639
Pub. in Proceedings of the IEEE Conference on Cybernetics and Society (1980) p1000-1002 Oct 80.

No abstract available.

AD-A100 932/3 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Complementary Role of Surface Hydrolysis and Intact Transport in the Intestinal Assimilation of Di- and Tripeptides.
Medical research progress rept.,
Elise M. Rosen-Levin, Kenneth W. Smithson, and Gary M. Gray. 3 Aug 79, 12p Rept no. NMRI-80-77
Pub. in Biochimica et Biophysica Acta, v629 p126-134 1980.

No abstract available.

AD-A101 101/4 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Evaluation of the Artificial Intelligence Program STAMMER2 in the Tactical Situation Assessment Problem.
Master's thesis,
John Peter Ferranti, Jr. Mar 81, 90p

STAMMER2 (System for Tactical Assessment of Multisource Messages, Even Radar) is an experimental program created as part of an investigation into methods of correlating information in the naval environment. This thesis is an exploration into the application of artificial intelligence to the tactical situation assessment problem and into various evaluation methodologies for STAMMER2. Included is an overview of one of these experiments, using the facilities of the Naval Postgraduate School Command, Control and Communications Laboratory and the Naval Ocean Systems Center, San Diego. (Author)

6E. Clinical Medicine

AD-A100 636/0 MF **A01**
Walter Reed Army Medical Center, Washington, DC.
Annual Progress Report (FY-80) Department of Clinical Investigation.
Rept. for 1 Oct 79-30 Sep 80,
Timothy M. Boehm. 30 Sep 80, 725p
Includes supplement dated Jun 81.
Availability: Microfiche copies only.

This report identifies the approved clinical research activities conducted at WRAMC (during FY-80) that have been approved and annually reviewed by the Clinical Investigation and Human Use Committees. An annual progress report is enclosed for each protocol active during FY-80. Also included is a list of publications and presentations during FY-80 that reflect work accomplished in conjunction with approved clinical investigation protocols.

AD-A100 763/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Development of a Two-Dimensional Multielectrode Array for Visual Perception Research in the Mammalian Brain.
Master's thesis,
Gary H. Fitzgerald. Dec 80, 145p Rept no. AFIT/GE/BE/80D-21

A review of previous mammalian visual systems neurological and psychological research is presented. Results of previous research motivated the development of a device that would record fine grained electroencephalic data from the surface of a living mammalian cortex. A multiplexing multielectrode array has been developed and tested for this purpose. The device consists of a four by four array of electrodes and sixteen junction field effect transistors fabricated on a silicon substrate using integrated circuit manufacturing techniques. In vitro tests indicated the device is capable of detecting and multiplexing fine grained cortical signals. Technical problems with the passivation material precluded in vivo evaluation. A solution to this problem is presented and an in vivo test procedure recommended. (Author)

AD-A100 799/6 PC **A12**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Analysis and Performance Evaluation of Electrocardiogram Data compression Techniques.
Master's thesis,
Melvin D. Townsend. Dec 80, 263p Rept no. AFIT/GE/EE/80D-46

EKG data compression techniques were investigated for potential real time implementation on an 8 bit Motorola 6800 microprocessor. Research indicated entropy reduction transform technique such as the Fast Fourier Transform and the discrete Karhunen-Loeve Transform were not feasible for implementation on the 6800. Two redundancy reduction (RR) techniques (TOLAN and DOWER) utilizing 2nd order difference operations in conjunction with variable length encoding were studied in detail. One such RR technique (TOLAN) was fully implemented and tested with 'in vivo' EKG data. Analysis revealed compression ratios ranging from 1.25:1 to 2.26:1. Investigation of the poor performance of the compression algorithm showed significant degradation of the 2nd order environment. It was concluded that real time EKG data compression is feasible on the 6800 but that time compression techniques which store a zero value sequence counter versus the value of zero are not efficient in a high noise environment. (Author)

AD-A100 853/1 PC **A11**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Military Health Service System: Non-User and User Perceptions and Evaluations.
Final rept.,
Richard J. Orend, and Richard D. Rosenblatt.
Jun 77, 227p Rept no. HUMRRO-FR-ED-77-14
Contract MDA903-77-C-0040

The overall objectives of this analysis were originally specified as (1) to estimate the percent of MHSS eligible beneficiaries who do not use the MHSS; (2) to determine why they do not use the MHSS; (3) to estimate the percent of MHSS eligibles who have health insurance comparable to MHSS; (4) to determine how and why they acquire this health insurance coverage; (5) to determine the relationship between non-use of MHSS and Health Insurance coverage; (6) to determine the type of health insurance coverage held by users and non-users of MHSS; and (7) to estimate dental utilization rates & dental costs to beneficiaries. (Author)

AD-A100 921/6 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
In Vitro Growth of Human Gingival Fibroblasts on Root Surfaces of Endodontically Treated Teeth.
Medical research progress rept.,
Robert M. Dunlap, Jonathan L. Gray, Donald W. Turner, Arthur R. Vernino, and John E. Williams, Jr. 1980, 6p Rept no. NMRI-81-21
Pub. in Jnl. of Periodontology, v52 n3 p140-142 Mar 81.

No abstract available.

AD-A100 922/4 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Attempts to Transfer the Resistance of Schistosoma Mansoni-Infected and Irradiated Cercaria-Immunized Mice by Means of Parabiosis.
Medical research progress rept.,
David A. Dean, Maria A. Bukowski, and Steven S. Clark. 21 Jun 80, 11p Rept no. NMRI-81-14
Pub. in American Jnl. of Tropical Medicine and Hygiene, v30 n1 p113-120 1981.

No abstract available.

AD-A100 924/0 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Improved Serodiagnosis of Salmonella Enteric Fevers by an Enzyme-Linked Immunosorbent Assay.
Medical research progress rept.,
William J. Beasley, Sam W. Joseph, and Emilio Weiss. 1980, 12p Rept no. NMRI-81-1
Pub. in Jnl. of Clinical Microbiology, v13 n1 p106-114 Jan 81.

No abstract available.

AD-A100 925/7 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Enteric Disease Program Assesses Health Risks to Naval Personnel.
Medical research progress rept.,
R. I. Walker, B. R. Merrell, J. C. Coolbaugh, William J. Beasley, and G. Pazzaglia. 1981, 9p Rept no. NMRI-81-3
Pub. in U.S. Navy Medicine, v72 p17-21 Jan 81.

No abstract available.

AD-A100 926/5 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Antigenicity of Freeze-Dried Bone Allograft in Periodontal Osseous Defects.
Interim rept.,
Donald W. Turner, and James T. Mellonig. Jan 81, 14p Rept no. NMRI-81-22
Pub. in Jnl. of Peridontal Research, v16 p89-99 1981.

No abstract available.

AD-A100 930/7 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Association of Aeromonas sobria with Human Infection.
Medical research progress rept.,
O. P. Daily, S. W. Joseph, J. C. Coolbaugh, R. I. Walker, and B. R. Merrell. 15 Dec 80, 12p Rept no. NMRI-81-25
See also Jnl. of Clinical Microbiology, v13 n4 p769-777 Apr 81.

No abstract available.

AD-A100 933/1 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Influence of Factor VIII/von Willebrand Factor Protein (F VIII/vWF) and F VIII/vWF-Poor Cryoprecipitate on Post-Ischemic Microvascular Reperfusion in the Central Nervous System.
Medical research progress rept.,
J. M. Hallenbeck, T. W. Furlow, Jr., and H. R. Grainick. 1980, 8p Rept no. NMRI-81-5
Pub. in Stroke, v12 n1 p93-97 Jan/Feb 81.

No abstract available.

AD-A100 934/9 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Occurrence of Vibrio Cholerae Serotype 01 in Maryland and Louisiana Estuaries.
Medical research progress rept.,
Rita R. Colwell, Ramon J. Seidler, James Kaper, S. W. Joseph, and Sue Garaes. 1980, 7p Rept no. NMRI-81-7
Pub. in Applied and Environmental Microbiology, v41 n2 p555-558 Feb 81.

No abstract available.

AD-A100 935/6 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Effect of Route of Mycobacterium Bovis BCG Administration on Induction of Suppression of Sporozoite Immunity in Rodent Malaria.
Medical research progress rept.,
Lloyd L. Smrkovski. 1980, 8p Rept no. NMRI-81-11
Pub. in Infection and Immunity, v31 n1 p408-412 Jan 81.

No abstract available.

AD-A100 955/4 PC **A14**/MF **A01**
Madigan Army Medical Center, Tacoma, WA.
Clinical Investigation Service Annual Research Progress Report Fiscal Year 1980,
Bruce L. Fariss. 1 Oct 80, 306p

The subject report identifies those individuals who are conducting investigative protocols at Madigan Army Medical Center. An abstract of each protocol giving abbreviated technical objectives, methods, and progress is presented. (Author)

HRP-0011225/0 PC **A08**/MF **A01**
Gulf Coast Health Planning Council, Tampa, FL.
The Delivery of Health Services to the Indigent in Hillsborough County, A Detailed Analysis with Recommendations.
Apr 76, 174p

The medically indigent are defined as those with an income of less than $4,328 for a single person, on a graduated scale up to $16,110 for a family of 10. With that definition, the number of medically indigent in Hillsborough County FL., was 273, 255 in 1975, 40 percent of the county's population. This study assesses the characteristics of the indigent (demography, social and cultural characteristics, and health status), the types of services available in Hillsborough County, how health services are financed, and identifies problems and needs at the primary, secondary, and tertiary levels and system wide. Some of the study's recommendations include: a network of primary care clinics should be established, the use of physicians assistants and nurse practitioners should be encouraged, a 'family practice' specialty and residency should be established at the University of South Florida College of Medicine. Eight appendices show the number of blacks, Spanish-speaking, elderly, and primary care physicians (general practitioners, internal medicine, obstetricians/gynecologists, pediatricians, optometrists, and dentists) in the county, projection of acute hospital bed needs through 1990, fee schedules and services covered by Medicare and general health insurance.

HRP-0029312/6 PC **A09**/MF **A01**
Friends of the Earth (Australia), Melbourne.
Issues and Requirements for a Homemaker-Home Health Demonstration Project: A Report to the Commissioner, Georgia Department of Human Resources, Atlanta, Georgia.
Mar 79, 178p
THIS DOCUMENT WAS ANNOUNCED PREVIOUSLY IN GRA ISSUE 8113. It is being reannounced with a new corporate author.

Issues relevant to a demonstration project to train and employ voluntary participants selected from the aid to families with dependent children (AFDC) program as homemaker-home health aides in Georgia are assessed. By training and employing AFDC recipients, it is hoped that employment needs of dependent populations can be met while allowing social and health agencies to expand existing services and, in some areas, offer new services. The emphasis is on cost containment through the utilization of voluntarily selected homemaker-home health aides. Employment prospects for aides are examined in relation to the Georgia Department of Human Resources and departmental divisions dealing with family and children services, mental health and mental retardation, physical health, aging, and youth services and vocational rehabilitation and also in terms of the Veterans' Administration. A home service aide model is detailed that focuses on proposal and demonstration planning requirements, determining the need for homemaker-home health aides, manpower resource requirements, demonstration site assessments, trainee selection criteria and process, training requirements, employment support requirements, private sector employment, demonstration project funding requirements (costs and funding options), demonstration implementation requirements, and evaluation requirements. Appendixes contain further information on the demonstration project in Georgia. A list of selected references and figures are included.

HRP-0029466/0 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Copayments and Demand for Medical Care: The California Medicaid Experience,
L. Jay Helms, Joseph P. Newhouse, and Charles E. Phelps. Feb 78, 38p R-2167-HEW
Grant DHEW-016B-7601-P2021

Zellner-type indirect regression techniques were used to assess the impact of a copayment requirement on the utilization of health care resources by the poor in California's Medicaid program. Data for the assessment came from the 1972 copayment experiment in California in which a group of Medi-Cal beneficiaries was required to make small payments for physician visits and prescription drugs, services that had previously been provided free. The sample for study included 40,662 individuals from three countries; 10,687 individuals were in the copayment group and 29,975 were not. Three constrained models were introduced that considered seasonal effects; assumed that coefficients of sex, age, and county were invariant over time; and assumed that copayment requirements had constant coefficients over time. A fully unconstrained model was also derived. The major finding of the study concerned copayment requirements in the hospital days equation. It was implied that imposing a charge of $1 per office visit increased hospital care provided per person by 0.024 day per quarter, a 17-percent increase relative to the precopayment average in the entire sample. Three possible explanations for the increased rate of hospitalization in the experimental copayment group are offered: (1) the increased rate is a statistical artifact; (2) the locus of treatment for a given mix of medical problems shifts in response to changes in relative prices; and (3) the mix of medical problems changes because those of whom copayment is required are deterred from seeking preventive or early diagnostic treatment in a physician's office. It is concluded that out-of-pocket payments for ambulatory services rendered to the poor may be self-defeating as a method of controlling health care costs. Supporting data and a list of references are included. Procedural information on the study is appended.

HRP-0030163/0 PC **A04**/MF **A01**
Texas Agricultural Experiment Station, Prairie View. Cooperative Research Center.

Availability and Distribution of Health Care Resources in the Twelve East Texas Counties; Rural-Urban Comparison,
M. A. Solliman. Mar 76, 67p INFORMATION-76-1

This study represents an investigation of the distribution of selected medical resources (medical personnel and facilities) in the twelve county region in South East Texas. In addition, the situation in terms of availability and distribution of these resources are compared with those that prevailed in 1970 and 1971 whenever the statistics are available. The data for this research were obtained from a wide range of sources: membership lists for medical associations, State licensing or examining boards, and other publications. Indices were developed from these sources and related to the population of each county. Medical personnel-population ratios at the national level were compared with state and county ratios and used as indices of availability of medical personnel.

HRP-0030624/1 PC **A07**/MF **A01**
Southern Research Inst., Birmingham, AL.
Vision and Other Aspects of Eye Health Care and Ophthalmic Services in South Carolina.
Final rept.
Mar 78, 143p SORI-EAS-78-611-REV, 3840-IR
Sponsored in part by South Carolina Board of Examiners in Optometry and Opticianry, South Carolina Optometric Association, and South Carolina Association of Opticians.

This report presents information and recommendations pertaining to vision and other aspects of eye health care and ophthalmic services in South Carolina. The specific purposes of this study have been: To characterize and assess the nature and status of evolving vision and other types of eye health care and ophthalmic services in South Carolina, with full recognition to present and evolving roles and functioning of all vision and other eye health-care term members; and To identify and assess opportunities for enhancing such care and services in the state and for achieving optimum and effective utilization of skilled practitioners, and to offer recommendations on how to achieve such enhancement and utilization.

HRP-0900340/1 PC **A08**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Concepts - Issues - Technology, Behavioral Health Planning: A Workbook of Suggested Approaches,
May 77, 160p
Contract PHS-HRA-230-76-0216
Prepared in cooperation with California Department of Health, Los Angeles. Health Training Center.

The workbook contains suggested approaches to behavioral health planning. The contents represents suggestions. The material is designed to stimulate local planning discussion and encourage communication among the participants in the planning process. The behavioral health planning activities of Health Systems Agencies impinge on long-established planning processes in which a large number of staff and volunteers have a considerable investment. The Workbook materials may be removed and reproduced for use as tools to facilitate decision making with them. Such decisions are often complicated by the fact that generalized planning guidelines, standards and criteria are not as useful to local agencies in planning for behavioral health as they may be in physical health planning.

HRP-0901423/4 PC **A02**/MF **A01**
Pan American Health Organization, Washington, DC.
Strengthening Information Services for Health Planning: Report of a Working Group on Mechanisms for Improving the International Exchange of Health Planning Information Held at Bielefeld, Federal Republic of Germany on June 13-15, 1978.
1978, 20p
Sponsored in part by Bureau of Health Planning and Resources Development, Hyattsville, MD.

As health ministries in many countries and private agencies and institutions in others have become increasingly committed to the health planning process, it has been brought to their attention that the experiences of one country and the lessons it has learned at the expense of human and financial resources have been difficult to transfer to others. A number of countries have established sophisticated information systems and libraries for the purpose of supporting their own national health planning programs, but the trasfer of information between and among such centers has been impeded for a number of reasons.

HRP-0902392/0 PC**$20.00**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning Reports: Subject Index. Part Three: Citations to Documents Announced by NHPIC from March 1978 through January 1980.
Health planning information series.
Oct 80, 707p
See also HRP-0902393.
Also available in set of 5 reports PC A00, HRP-0903125.

The Health Planning Reports Index is a listing of citations to the National Health Planning Information Center's (NHPIC) collection of health planning literature and Government reports and studies. The Index is intended for use by health planning agencies to facilitate access to all health planning documents announced by the NHPIC, and it is published in four volumes: the Subject Index, Personal Author Index, Corporate Author Index, and the Title Index.

HRP-0902393/8 PC**$20.00**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning Reports: Corporate Author Index.
Health planning information series.
Oct 80, 752p
See also HRP-0902392 and HRP-0902394.
Also available in set of 5 reports PC A00, HRP-0903125.

The Health Planning Reports Index is a listing of citations to the National Health Planning Information Center's (NHPIC) collection of health planning literature and Government reports and studies. The Index is intended for use by health planning agencies to facilitate access to all health planning documents announced by the NHPIC, and it is published in four volumes: the Subject Index, Personal Author Index, Corporate Author Index, and the Title Index. This volume contains the Health Planning Reports Corporate Author Index and includes citations of documents which were identified and processed by NHPIC from May 1975 to January 1980. It also contains document citations of nurse planning reports and studies.

HRP-0902394/6 PC**$20.00**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning Reports: Personal Author Index.
Health planning information series.
Oct 80, 1018p
See also HRP-0902393 and HRP-0902592.
Also available in set of 5 reports PC A00, HRP-0903125.

The Health Planning Reports Index is a listing of citations to the National Health Planning Information Center's (NHPIC) collection of health planning literature and Government reports and studies. The Index is intended for use by health planning agencies to facilitate access to all health planning documents announced by the NHPIC, and it is published in four volumes: the Subject Index, Personal Author Index, Corporate Author Index, and the Title Index. This volume contains the Health Planning Reports Personal Author Index. It also includes citations of documents which were identified and processed by NHPIC from May 1975 to January 1980. It also contains document citations of nurse planning reports and studies.

HRP-0902592/5 PC**$20.00**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning Reports: Title Index.
Health planning information series.
Oct 80, 805p
See also HRP-0902394 and HRP-0903126.
Also available in set of 5 reports PC A00, HRP-0903125.

The Health Planning Reports Index is a listing of citations to the National Health Planning Information Center's (NHPIC) collection of health planning literature and Government reports and studies. The Index is intended for use by health planning agencies to facilitate access to all health planning documents announced by the NHPIC, and it is published in four volumes: the Subject Index, Personal Author Index, Corporate Author Index, and the Title Index. This volume contains the Health Planning Reports Title Index. It includes citations of documents which were identified and processed by NHPIC from May 1975 to January 1980. It also contains document citations of nurse planning reports and studies.

HRP-0903126/1 PC**$75.00**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning Reports: Subject Index. Part Four: Citations to Documents Announced by NHPIC from March 1978 through January 1980.
Health planning information series.
Oct 80, 577p
See also HRP-0902592.
Also available in set of 5 reports PC A00, HRP-0903125.

The Health Planning Reports Index is a listing of citations to the National Health Planning Information Center's (NHPIC) collection of health planning literature and Government reports and studies. The Index is intended for use by health planning agencies to facilitate access to all health planning documents announced by the NHPIC, and it is published in four volumes: the Subject Index, Personal Author Index, Corporate Author Index, and the Title Index. The current volume is the third part of the Health Planning Reports Subject Index, and includes citations of documents added to the data base of the National Health Planning Information Center between March 1978 and January 1980. Specific topics on nurse planning may be identified by reviewing the alphabetical classification listing at the end of the Health Planning Subject Reports Index. Part I of the Index included citations to documents which were published prior to 1975. Part II of the Index were citations announced by the Center published from 1976 through March 1978.

HRP-0903172/5 PC **A02**/MF **A01**
National Council on Health Planning and Development, Washington, DC.
Federal, State and Local Relationships in Health Planning.
Issue paper,
Lindsay R. Resnick. 1980, 18p

The purpose of this paper is to examine certain issues surrounding the relationships among the three levels of health planning with respect to the implementation and administration of the Act. The focus of this paper is -- deliberately -- on the negative aspects of the relationships among federal, state and local planning.

HRP-0903179/0 PC **A07**/MF **A01**
Health Care Financing Administration, Washington, DC.
Benefit Recovery in the Minnesota Title XIX Program,
Beth A. Wahtera. Mar 80, 145p HCFA-20045

The Minnesota Benefit Recovery Unit was considered fully operational as of December 1975. It was at that time that system enhancements first facilitated the generation of the Health Insurance Claim form and the identification of paid invoices for which potential third party liability existed. As a result, the State's approach to TPL utilization drastically changed from the interim procedures of manually monitoring the existence of TPL to the present approach of performing post payment recovery for those invoices paid by Title XIX funds, but for which the provider has not pursued TPL. This document includes the following: (1) Provides adequate descriptions of current TPL procedures and policies that have substantially changed since the publication of the 1977 document without being of insufficient detail nor inundating the reader; (2) Provides a generalized overview of the Minnesota Title XIX program and the Benefit Recovery Unit to be used as a reference point in conjunction with the more detailed aspects of third party as contained herein; and (3) Provides detail and description of the present status of the activity, specifically the implementation of the OHC file.

HRP-0903212/9 PC **A03**/MF **A01**
Maryland Dept. of Health and Mental Hygiene, Baltimore.
Cardiac Catheterization and Surgery Services: Criteria and Standards Applicable for Reviews of the Appropriateness of Existing Institutional Health Services,
William B. Landis. 22 Dec 80, 31p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The purpose of the Appropriateness Review Program is to determine the appropriateness of institutional health services and to recommend remedial action to insure that services in an area are appropriate for the citizens' needs. The purpose of these criteria and standards is to enable reviewing Health Systems Agencies, the Maryland Health Planning and Development Agency, and the institution under review to identify institutional health services warranting intensive review to determine appropriateness or inappropriateness.

HRP-0903213/7 PC **A03**/MF **A01**
Maryland Dept. of Health and Mental Hygiene, Baltimore.
Criteria and Standards Applicable for Reviews of the Appropriateness of Existing Institutional Health Services.
Nov 80, 37p
Sponsored in part by the Bureau of Health Planning, Hyattsville, MD.

The purpose of these criteria and standards is to enable the reviewing Health Systems Agencies, the Maryland Health Planning and Development Agency, and the institution under review to identify institutional health services warranting intensive review to determine appropriateness or inappropriateness. An additional purpose is to inform providers of institutional health services of the numerical limits of services acceptability to be used by the health planning agencies.

HRP-0903223/6 PC **A07**/MF **A01**
Codman Research Group, Inc., Hanover, NH.
Variations in Population-Based Use Rates and Expenditures: Implications for Manpower Policy,
John Wennberg, Richard Greene, Michael Zubkoff, and Coralea Lapenas. Mar 81, 149p
Sponsored in part by Health Resources Administration, Hyattsville, MD. Office of Graduate Medical Education.

This report was developed to support the efforts of the Geographic Distribution Technical Panel of the Graduate Medical Education National Advisory Committee (GMENAC). The GMENAC was created in April of 1976 as an advisory body to the Secretary of Health, Education, and Welfare. The committee was charged with making recommendations on the future supply and requirements of physicians by specialty and geographic location. This report addresses two charges to the Geographic Panel calling for an analysis of the relationship between variations in use and procedure rates and local physician distribution and calling for a definition of acceptable levels of variation in supply as well as use rates. A number of studies had indicated that the physician supply/service distribution relationship is a complex one and should be factored into policy decisions on the geographic distribution of physicians. This report provides an analysis of these issues.

HRP-0903224/4 PC **A02**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
An Analysis of the Content of Specialty Practices and Their Service Capacities. Executive Summary.
Mar 81, 17p DHHS/PUB/HRA-81-649
Contract PHS-HRA-232-79-0088
See also HRP-0903225.

This present report compares the activities of various physician specialties which care for patients with highly similar problems. It also assesses the influences which determine the practitioner's tendency to treat more patients and devote more hours to his or her practice. It is believed that the information contained in this report should be of value to all persons interested in graduate medical education and health manpower analysis.

HRP-0903225/1 PC **A18**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
An Analysis of the Content of Specialty Practices and Their Service Capacities.
Mar 81, 406p DHHS/PUB/HRA-81-650
Contract PHS-HRA-232-79-0088
See also HRP-0903224.

One of the major responsibilities of the Office of Graduate Medical Education (OGME) and its Research and Analysis Branch includes assessing and projecting physician manpower needs by specialty. In pursuit of this objective, OGME has engaged in the development and support of various modeling and analytical activities aimed at understanding practice patterns within and among physician specialties. These activities have been carried out both by OGME staff and by contract studies. One area of activity calls for analyzing a highly comprehensive data set produced for the Health Resources Administration. The data stem from a series of surveys performed by the University of Southern California and resulted in detailed practice profiles covering 24 medical and surgical specialties. This data set contains a rich source of material on physician specialty practice profiles that will require intensive analysis and assessment. The present report is among the first of an anticipated series of analyses of this data base.

HRP-0903226/9 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Developing a Profile of Health Service Area Organizations, Groups, and Community Resources,
Elizabeth M. Farnham. May 81, 19p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

If health planning is to remain a locally controlled activity, it must continue to expand the opportunities for diverse and competing elements to be involved in the development and implementation of activities designed to achieve local, state, and national objectives. The 1979 Amendments to the National Health Planning and Resources Development Act (P.L. 96-79) made two major modifications in the requirements for composition and selection of governing bodies of Health Systems Agencies (HSAs). One specific aspect of these modifications is the identification of the variety of potential groups in a community which, either directly health related or not, represent an organized constituency and might become involved in HSA activities. Steps are outlined to guide an HSA in implementing this aspect: (1) identifying representation and specific types of information needed; (2) developing a master list of community groups and service providers; (3) collecting and storing the required information; and (4) updating and maintaining the central listing. The information which is discussed suggests some ways an HSA could go about developing a profile of community organizations in its area. There is no one combination of tools or approaches for this task which are guaranteed to provide the HSA with a complete list of all relevant groups in its area.

HRP-0903227/7 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Study of the Allegan and Lake Dental Service Areas for Shortages of Dentists.
Dec 80, 18p

This study presents an analysis of the Allegan and Lake dental care service areas for shortages of dentists. Criteria for Designation of Health Manpower Shortage Areas published by the Department of Health and Human Services (DHHS) was used. Findings indicate both areas to have population to dentist ratio less than 5000:1; therefore, not eligible for designation as health manpower shortage areas for dentists.

HRP-0903228/5 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Observations about Self-Help Groups.
Staff paper.
10 Sep 80, 7p STUDY-80-19
Presented to the Mental Health/Mental Retardation Planning Section on September 10, 1980, and WMHSA Board of Directors on October 20, 1980. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The report is a summary of key information collected via informal interviews with area mental health providers and a review of the literature.

HRP-0903230/1 PC **A07**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Geographic Patterns in the Risk of Dying and Associated Factors Ages 35-74 Years: United States, 1968-72.
Vital and health statistics series,
Herbert I. Sauer. Sep 80, 131p VHS/SER-3/18, DHHA/PUB/PHS-80-1402
Also pub. as ISBN-0-8406-0184-0. Library of Congress catalog card no. 79-607165. Analytical studies no. 18.

Sex-race-specific death rates for ages 35-74 years (age-adjusted) are presented for selected causes of epidemiological importance for each State and each of 510 State economic areas. Factors associated with geographic differences in death rates include mining, elevation, population density, some indexes of patient care resources, and especially the 'enigma of the Southeast.'

HRP-0903231/9 PC **A05**/MF **A01**
Public Health Service, Rockville, MD. Office on Smoking and Health.
Smoking and Health Bulletin, August-September 1980, Abstracts 1067-1312.
Sep 80, 83p
Also pub. as ISSN-0081-0363. See also HRP-0902689.

Contents: Agriculture; Chemistry; Pharmacology and toxicology; Mortality and morbidity; Neoplastic diseases; Non-neoplastic respiratory diseases; Cardiovascular diseases; Pregnancy and infant health; Other diseases and conditions; Behavioral and educational research; Smoking cessation methods; Tobacco additives; Tobacco manufacturing and processing; and Tobacco economics.

HRP-0903235/0 PC **A03**/MF **A01**
Office of the Assistant Secretary for Health, Washington, DC.
Healthy Children: Effective Public Health Practices for Improving Children's Oral Health.
May 80, 35p DHHS/PUB/PHS-80-50136

This document presents Public Health Service (PHS) guidelines regarding the most acceptable dental public health practices for improving children's oral health. In making its recommendations, the PHS aim is to improve the effectiveness, efficiency and quality of children's dental services in public programs. Working within the framework of these recommendations, individual programs can and should be tailored to meet the particular needs and unique circumstances of individual localities or eligible population groups.

HRP-0903236/8 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Staff Paper: An Overview of Respite Care Programs.
Mar 80, 21p

This paper is an examination of different ways to develop respite care programming in area agencies. Essentially, its purpose is to stimulate implementation of these programs as called for in the Health Systems Plan (Status Goal 19 and System Objective H.1.b.). It is concluded that respite care programs provide a valuable alternative to the burdens of parental care in addressing the cost containment and prevention themes.

HRP-0903237/6 PC **A07**/MF **A01**
Western Wisconsin Health Systems Agency, Inc., La Crosse.
Alternate Care Study Report.
Dec 80, 136p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The stated objectives of this study include: (1) collecting of data reflecting current needs of a segment of Western Wisconsin Health Systems

Area's population; (2) involving appropriate area health professionals in the development and implementation of the health systems plan; (3) providing the opportunity for work with state legislators and/or private industry to modify existing reimbursement mechanisms which promote costly and often inappropriate or unacceptable institutionalization; (4) promoting development of a wide range of alternate care services and resources for the area's population which will prevent unnecessary institutionalization; and (5) improving the health status of the area's population through more appropriate levels of care. All participating agencies recorded an assessment of each of their home health and public health nursing clients age 65+, using a slightly expanded form of the Grauer Functional Rating Scale, for a three-month period (January 1980-March 1980). The estimate of need for alternate care considers three population groups (noninstitutionalized population age 65+, nursing home residents, and hospital admissions) as potential users of alternate care services. An evaluation of each county's situation is given along with a total regional summary. Results indicate that a division of alternate care services into three basic levels of care would be more appropriate for purposes of analysis and further planning: (1) functional level indicating imminent institutionalization; (2) a level indicating that alternate care services could be instrumental in preventing or delaying institutional placement; (3) relatively high functional level and for the most part receiving basic alternate care services. Tables with relevant data and a copy of the Grauer Functional Rating Scale are appended.

HRP-0903238/4 PC **A02**/MF **A01**
Health Insurance Inst., Washington, DC.
Competition in the Health Care System: An Evaluation of the Pro-Competition Bills.
Mar 81, 21p

Within the context of stimulating a stronger competitive marketplace, a number of bills commonly referred to as the 'pro-competition' bills were introduced in the 96th Congress. Intensive debate of these bills can be expected in the 97th Congress. The six pro-competition bills are analyzed as a group. The following aspects are discussed in light of the group as a whole: the tax cap and rebate, the need to define the low-option plan, competition versus choice of insurance plans, multiple carrier requirements, employers who self-insure, and two-earner families. Factions who support and oppose the pro-competition bills are considered as well as amendments that might be introduced. These bills have evolved from an initial concept of enhancing consumer choice among competing plans. Many of the serious adverse effects of the proposals relate to the high-cost, low-cost plan choice, with associated tax cap and rebate provisions. A solution may be to abandon these features and revert to the original concept of competing provider plans, i.e., consumer choice of a conventional benefit plan and one or more health maintenance organizations or similar alternative care provider plans, as available in the community.

HRP-0903241/8 PC **A03**/MF **A01**
InterStudy, Excelsior, MN.
Design for a Corporate Health Care Monitoring System,
Mary M. Hunter, and John C. Rosala. Sep 80, 43p
Grant HCFA-18-97019

Although employee health directly affects a firm's productivity, many comanies have little information available on the quality or cost effectiveness of their employee health services. The lack of adequate health care utilization and cost data is a major obstacle to formulating effective long-term cost containment measures and cost-benefit analyses. A health care monitoring system can identify the costs and utilization of employee health care, can enable measurement of exceptions and trends, and can facilitate the tracking of corporate programs addressing health care costs and quality. The Corporate Health Care Monitoring System (CHCMS) described in this report is two-tiered. The system's summary level provides division managers with data on five utilization indicators (number of hospital admissions, number of hospital inpatient days, average length of hospital stay, number of surgical procedures, and number of outpatient provider encounters) and six cost indicators (premium payments, reported charges, claims paid, hospital inpatient costs, surgical expenses, and out-of-hospital costs). The detailed level's reporting capability can provide both diagnosis-specific and provider-specific information on request when summary statistics indicate a potential problem. Adaptation and implementation of the CHCMS requires the commitment of adequate resources for design, testing, installation, and evaluation of a local system. Summary report formats, sample calculations, and sample diagnostic categories are appended. An executive summary is included.

HRP-0903242/6 PC **A05**/MF **A01**
Western Wisconsin Health Systems Agency, Inc., La Crosse.
Western Wisconsin Health Systems Agency Hospital Bed Need Task Force Final Report.
Mar 81, 77p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Task Force combined statistical study with a series of public meetings to analyze needs for acute care hospital beds in the predominantly rural area. Study of data indicates declining utilization due primarily to decreased length of stay as well as a decline in admissions to rural and an increase in admissions to urban facilities. The Task Force rejected normative bed need approaches in favor of stochastic methodologies, which recognize that daily census is more variable in smaller facilities and requires a lower occupancy rate .Using a model developed by the Wisconsin Hospital Association, actual census data for general/medical/surgical, obstetrical, pediatric, and intensive care services was applied to five statistical distributions to determine the one most closely fitting actual distribution. This distribution was then employed to project needs using the following probabilities for not having beds available when needed: 1 percent of the time for obstetrial beds and 2 percent for the other three services. For most other services and for facilities not submitting census data, the Poisson-Normal formula was used. Fifteen percent of the area's beds are unneeded. Nine recommendations for dealing with excess capacity are specified, as are five recommendations for improving the viability of community hospitals. Appendices include the Task Forces's charge, tables, graphs, maps, and charts.

HRP-0903243/4 PC **A08**/MF **A01**
Health Planning Council of the Midlands, Omaha, NE.
Guide to Project Review Procedures and Criteria. 1980 Edition.
23 Oct 80, 171p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Planning Council of the Midlands (HPCM) utilizes the health systems plan and annual implementation plan to provide the basic set of community values and priorities to be used when making recommendations regarding proposed health facilities and services. The project review operating procedures specify the membership and functions of the review committee and guidelines for conflict of interest. An outline for determining nonsubstantive reviews and summary reviews is provided. Roles and responsibilities in the review process are discussed for the applicant, the review team, the project review committee, and the HPCM executive committee. Policies are provided for staff consultations with potential applicants and for agency decisions, findings, recommendations, reports, and files. Evaluation techniques for general assessment are in the form of checklists and questionnaires to be completed by the review team assigned to the project. Sixteen general criteria for review and guidelines and criteria for feasibility analysis are listed. Sample formats are included for reporting staff findings and recommendations. Thirty-one terms relating to health care facilities, resources, and 'persons' are defined. The appendix consists of criteria and standards for 19 health care services: occupational health and safety; individual health protection; detection; pediatric; obstetrics; surgery; diagnostic radiology; therapeutic radiology; emergency medical; dental health; mental health, alcoholism, and drug abuse; general medical; habilitation/rehabilitation; maintenance; personal health care support; health education; cost containment; and acute care bed need determination.

HRP-0903244/2 PC **A02**/MF **A01**
George Washington Univ., Washington, DC. Intergovernmental Health Policy Project.
A Legislative Snapshot: Medicaid Legislation: Eligibility, Service Coverage Reimbursement and Administration,
Kathleen A. Brennan. 1980, 19p
Grant PHS-18-P-27

Title XIX of the Social Security Act requires state Medicaid programs to provide a certain level of coverage and eligibility; beyond that, however, states are given great leeway to determine the configuration of their programs. Twenty-one states enacted 40 separate pieces of legislation pertaining to medical assistance eligibility, service coverage, reimbursement, and administration during the 1979 session. The changes wrought by the legislatures on the administrative organization of Florida's department to a reduction in the counties' contribution to Nebraska's medical assistance program. California, Hawaii, Idaho, Illinois, New Hampshire, New York, and North Carolina all examined the reimbursement process set up in their Medicaid legislation and made alterations in the mechanism. Evidence of legislative involvement in the scope of services can be seen in state authorizing and appropriating legislation in 1979. Medicaid eligibility standards were altered in 1979 by a number of states that either changed categorical groups or income/asset ceiling. A state-by-state summary of 1979 enactments relating to Medicaid is provided.

HRP-0903245/9 PC **A04**/MF **A01**
George Washington Univ., Washington, DC. Intergovernmental Health Policy Project.
Medigap: States Responses to Problems with Health Insurance for the Elderly,
T. Van Ellet. c1979, 67p
Grant HCFA-18-27

The many deficiencies in the Medicare program are briefly elaborated in an effort to explain much of the Medigap abuse taking place today. Due to these gaps in Medicare funding more elderly over age 65 are turning to private health insurance. Types of policies offered to the elderly fall into three categories: the Medicare supplement policy (including major medical policies), the indemnity policy, and the limited, or dread disease , policies. various marketing abuses/tactics by insurance agents are explained. The National Association of Insurance Commissioner has promulgated generic model regulations about the sale of health insurance that also affect health insurance for the elderly. These include: (1) unfair trade practices act; (2) advertising; (3) policy holder complaints; (4) premium rate controls; (5) minimum standard requirements; and (6) policy readability. Selected actions taken to regulate the sale of private health insurance are briefly summarized for 18 states. Results from an independent survey of state insurance department officials are presented to gain insight into their attitudes and opinions about Medigap problems. Forty-two of fifty departments surveyed responded. Possible actions by states can be broken down into five general areas: investigation of private health insurance; insurance policy benefits and content; insurance agent activities; insurance company activities; and consumer information activities and disclosure. Specific state laws and regulation regarding Medigap are tabulated and appended.

HRP-0903249/1 PC **A05**/MF **A01**
Suburban Cook County-Dupage County Health Systems Agency, Inc., Oak Park, IL.
Procedure Manual for Appropriateness Review,
Feb 81, 78p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Health Systems Agencies (HSAs) are required by section 1513(g) of the Public Health Service Act to conduct appropriateness reviews of existing institutional and home health services. Reviews are performed on an areawide basis, with findings reported to the State Health Planning and Development Agency (SHPDA). Each review addresses a

category of service, with definitions of categories and review sequences established by the SHPDA. This manual outlines procedures for the following aspects of an appropriateness review: (1) notification of beginning of review; (2) information requirements; (3) format and findings; and (4) public participation, including public hearing and reconsideration of HSA recommendations or findings. The appendix includes the current schedule for Suburban Cook County-DuPage County HSA appropriateness review, a sample appropriateness review cycle, the schedule for state (SHPDA) appropriateness review, definitions of categories of service, and review criteria and standards for the following: general criteria and standards (5 criteria, 5 standards); end stage renal disease (10, 15); cardiac catheterization (8, 12); cardiac surgery (12, 14); therapeutic radiology (8, 17); transmission computerized tomographic scanning (10, 15); acute mental illness (16, 28); chronic mental illness (12, 20); alcoholism treatment (17, 27); burn treatment (11, 13); and rehabilitation (12, 28). No sources or discussions of rationale are provided for these criteria and standards.

HRP-0903250/9 PC **A04**/MF **A01**
Health Planning Association of Western Kansas, Inc., Hays.
Project Review Manual,
Jan 81, 63p
See also HRP-0030016, Oct 78. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Planning Association of Western Kansas is responsible for reviewing health project proposals which require a certificate of need or which use certain Federal funds. This manual outlines procedures, sequence of events, and responsibilities for these reviews. The review process consists of (1) preapplication procedures; (2) submission of application and completeness review; (3) public notice of review; (4) schedule for review; (5) staff report; (6) subarea advisory council public meeting; (7) project review committee public meeting; and (8) board of directors public hearing. Procedures regarding review policies, objectives, criteria and standards, review findings, and applicant information requirements are enumerated. The Kansas Statewide Health Coordinating Council statement on certificate of need review for inpatient acute care projects is included. Appendix A provides general review objectives and criteria. Appendix B lists review standards, with sources and discussions of rationale, for the following services and facilities: acute care (9 criteria, 14 standards); adult care homes (3, 3); diagnostic radiology, including computed tomography scanning (6, 11); family planning and adolescent pregnancy programs (2, 2); immunization programs (1, 1); intermediate care facilities for the developmentally disabled (6, 7); primary health care (4, 7); acute cardiovascular services (2, 2); end stage renal disease (9, 25); and radiation therapy (6, 16). Appendix C is a map of the association's health service area.

HRP-0903251/7 PC **A02**/MF **A01**
George Washington Univ., Washington, DC. Intergovernmental Health Policy Project.
A 'Snapshot' of 1979 State Health Insurance Legislation: Administrative and Fiscal Regulation,
Peter E. Carlin. 1980, 25p
Grant HCFA-18-27321

Since the enactment of the McCarren-Ferguson Act of 1945, state legislatures have addressed a myriad of issues pertaining to health insurance. The functions of state insurance departments, which have traditionally focused on administrative and fiscal oversight of the insurance industry, generally include: ensuring that rates are not excessive or unfairly discriminatory; licensing companies and their agents; maintaining a system of financial and trade regulations; examining a company's financial condition and claims practices; and applying for a court order in the event of liquidation, rehabilitation, or conservation of a company. In 1979, twenty-nine states enacted statutes relating to the administrative and fiscal regulation of health insurance. Six states passed legislation with respect to monitoring the financial health of insurance companies. Administrative regulation of health insurance companies was the subject of 13 state laws, the bulk of which grant insurance departments enormous power in regulating health insurance plans. Other prominent issues addressed were minimum standards for language used in insurance policies, contracts, and certificates; the confidentiality of an insured's records; the overall effectiveness of health insurance legislation; and the problem of establishing guidelines for conversion policies. A state-by-state summary of 1979 legislation related to health insurance is included.

HRP-0903253/3 PC **A05**/MF **A01**
Public Health Service, Rockville, MD. Office on Smoking and Health.
Smoking and Health Bulletin: Abstracts 80--1313-80--1584.
Rept. for Oct-Nov 80,
1981, 92p
Also pub. as ISSN-0081-0363. See also HRP-0902689.

All items appearing in the Smoking and Health Bulletin will become part of the Technical Information Center (TIC) of the Office on Smoking and Health and can be referred to by their accession numbers. At the end of each year a cumulated index will be published; therefore the user is advised to retain the individual issues as well as the cumulative index. The Bulletin is issued at irregular intervals as the amount of new material warrants. The first and last abstract numbers and the cutoff date are shown on each issue to permit consecutive filing. The Office on Smoking and Health continues to offer retrieval of information on smoking through the Automated Search and Retrieval System. This search system, announced in the June-July 1976 issue of the Bulletin, permits researchers and others to obtain bibliographic information on smoking and health in printout form. A Search Request form, which can be submitted to the Office, will be found in each issue of the Bulletin. The data base, totalling over 13,000 items, contains all literature collected, processed, and published in the Bulletin from 1970 to the present.

HRP-0903254/1 PC **A02**/MF **A01**
Health Systems Agency of Northeast Florida Area 3, Inc., Jacksonville.
Hospitalizations in Northeast Florida, 1978,
Feb 80, 24p
Prepared in cooperation with Bureau of Health Planning, Hyattsville, MD.

This is one in a series of annual reports on acute care civilian hospital services in Northeast Florida. This report describes where area residents go to recieve hospital care within Florida Health Service Area No. 3, as it was originally designated. The 'patient origin' report covers hospitalizations in Baker, Clay, Duval, Flagler, Nassau and St. Johns Counties during calendar year 1978. Volusia County was added to Area 3 in July, 1978. Since Volusia County statistics are not yet available it will not be covered in this report. It should be further noted that hospitalizations of area residents in facilities outside the planning area are not included in this report. The data presented in the following tables have been derived from a computerized hospital usage study in which all area hospitals participate.

HRP-0903255/8 PC **A02**/MF **A01**
Health Systems Agency of Northeast Florida Area 3, Inc., Jacksonville.
County Profiles, Hospitalizations in Northeast Florida for 1978,
Feb 80, 17p
Prepared in cooperation with Bureau of Health Planning, Hyattsville, MD.

This is one of a series of annual studies that is intended to show the hospitalization patterns of the area's residents. It shows the hospitals principally used by the residents of the planning area, of each county and the five major segments of Duval County. Additionally, the study presents the distribution by age of the patients, by medical service delivered and method of payment. Finally, it summarizes the number enrolled and the amounts paid by the Medicare and Medicaid programs.

HRP-0903258/2 PC **A03**/MF **A01**
Nebraska State Dept. of Health, Lincoln. Div. of Health Data and Statistical Research.
Nebraska Health Manpower Reports: Licensed Practical Nurses 1979.
1979, 29p
Prepared in cooperation with Nebraska State Board of Nursing, Lincoln. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This report is based on information provided by the State's LPN's in response to a series of questions printed on the reverse side of their license renewal applications. These applications were mailed and received by the State Board of Nursing, with most data processing and statistical tabulations accomplished by the State Department of Health. The survey was conducted as part of an ongoing research project in health manpower. The Cooperative Health Statistics System, a program of the National Center for Health Statistics and the Department of Health, Education, and Welfare, began annual surveys of thirteen licensed health professions, including RN's and LPN;s, in 1971.

HRP-0903259/0 PC **A04**/MF **A01**
Michigan Dept. of Mental Health, Lansing.
A Response to the Report of the Governor's Committee on Unification of the Public Mental Health System.
28 Mar 80, 53p

The Governor's Committee on Unification of the Public Mental Health System submitted its final report to the Governor on January 30, 1980. The Department wishes to thank the Committee for the devotion it exhibited in defining the structure and functions of a model public mental health system. The recommendations emanating from this Committee constitute a thoughtful and reflective process. As directed by the Governor, the Director and other personnel of the Michigan Department of Mental Health closely followed the work of the Committee. On February 6, 1980, the Department released a preliminary response to the Committee's final report. A more extensive analysis of the final report's eighty recommendations is now presented.

HRP-0903260/8 PC **A03**/MF **A01**
Michigan Dept. of Mental Health, Lansing.
Into the 80's: The Report of the Governor's Committee on Unification of the Public Mental Health System.
Final rept.,
30 Jan 80, 39p

The Governor's Committee on Unification of the Public Mental Health System recommends establishing a single point of responsibility for voluntary and involuntary entry into Michigan's public mental health system, for determination and oversight of the services it provides, for system exit, and for the resources that support services delivery. That single point of responsibility is to be located in the community. It is designated as a local mental health authority encompassing one or more counties. Greater responsibilities than are now possessed by community mental health programs are recommended for each authority. Greater authority, including the control of its direct service personnel and fiscal resources, is recommended for the authority.

HRP-0903263/2 PC **A09**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Health Services Administration.
Excess Mortality Risk in Baltimore City by Regional Planning District and Census Tract 1969-77.
Final rept.,
Monroe Lerner. 30 Apr 80, 180p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

As a necessary first step in planning public health programs, Health Systems Agencies are expected to identify populations within their areas at excess risk of ill-health and to identify its determinants; this is usually to be done, at least initially, by using data routinely available to the Agency. The present report provides the results of one such effort in which populations and areas at excess mortality risk in Baltimore were identified for the nine-year period 1969-77 (and each of its three three-year components) for the total population of Baltimore, by age, by race, by sex, and for 23 major causes of

death. Excess mortality risk was, in turn, separated into severe, moderate, and mild categories of excess risk. Both Regional Planning Districts (RPDs) and individual census tracts constituted the units of analysis.

HRP-0903264/0 PC **A05**/MF **A01**
Maine Dept. of Human Services, Augusta. Bureau of Health Planning and Development.
Population-Based Measurement of Hospital Use in Maine Areas, 1976,
David Soule. Dec 79, 97p
Contract PHS-HRA-230-76-0298
Prepared in cooperation with Maine Health Data Service, Portland.

This report is the culmination of a series of analyses that began in 1968 with collection of patient origin data, definition of geographic areas for analysis of hospital use, computation of area admission rates to hospitals, and computation of distributions of admissions to local and non-local hospitals. The basic findings from the 1968 data are set forth in a 1969 report published by the Health Facilities Planning Council, Patient Origin Study 1968: An Analysis of Data on Maine Towns, Populations, Hospitals and Admission. The work that went into that first patient origin study was expanded to collection of 100% discharge data from all Maine hospitals, further applications of the area concept and definitions, and computation of population-based (epidemiologic) rates of hospital use by the residents of the various areas. Some of the data from the 100% file were published in an updated patient origin study, issued in 1977 by the Maine Health Data Service.

HRP-0903265/7 PC **A02**/MF **A01**
Delaware Interim Comprehensive Health Planning Council.
Heath Care Cost in Delaware: Report to the Governor.
Jun 77, 18p

The complexity of the financial system of health care cost is such that, from consumer to physician or hospital administrator, no one seems able to contain the rising costs. All agree, however, that steps must be taken almost immediately to contain these increases. This report seeks to address the existing dilemma by examining the nature of these cost increases; and, suggest ways in which Delaware, its citizens and its government, may contain the tide of rising health care costs.

HRP-0903266/5 PC **A04**/MF **A01**
Southern Regional Education Board, Atlanta, GA.
Planning Mental Health Programs and Facilities: Under Public Law 93-941.
1978, 60p

In this publication an attempt has been made to provide information about the multiples related to the planning for mental health programs and facilities under the National Health Planning and Resources Development Act (PL 93-641). There are no established answers, but there are commonalities--especially in the area of Certificate of Need and the roles of the SHCC and the SHPDA. There are also some considerable differences in the evaluation of the cost factors and also in the review processes conducted by the Health Systems Agencies. The general health and mental health systems are different systems but they are also compatible with each other. The information is provided to give basic background to be used by all parties in planning for mental health programs and facilities at both the local and state levels.

HRP-0903267/3 PC **A04**/MF **A01**
Southern Regional Education Board, Atlanta, GA.
The Mental Health Aspects of Health Planning.
1977, 64p

There is need for both the staff persons and governing body members of the health planning agencies and the staff persons and board members of local and state mental health agencies to have a clearer notion of the mental health aspects of health planning so that this aspect can be as effective as possible. This publication explains some of the differences in perspectives between general health and mental health, some of the organizational differences, some differences in definitions, and some of the differences in service delivery.

HRP-0903268/1 PC **A02**/MF **A01**
Nebraska State Dept. of Health, Lincoln. Div. of Health Data and Statistical Research.
Nebraska Health Manpower Reports: Nursing Home Administrators 1978.
1978, 20p
See also HRP-0016420.

The data contained in this report were collected by questionnaires mailed to each Nursing Home Administrator licensed by the State of Nebraska as of February 1, 1978. The total number of licensed Nursing Home Administrators on this date was 482, of whom 415 were either employed in Nebraska or retired and residing in Nebraska. These 415 Nursing Home Administrators - and, more specifically, the 359 who were employed in Nebraska on the above data - constitute the statistical population for the major portion of this report. Annual surveys of thirteen licensed health professions are conducted by the Division of Health Data and Statistical Research of the State Department of Health, in order that timely and reliable data concerning the supply, distribution, and characteristics of health manpower in Nebraska may be made available at the State and local levels. In addition, information from these surveys is forwarded to the National Center for Health Statistics for inclusion in the Cooperative Health Statistics System at the national level. This report contains primarily summary data relating to Nebraska Nursing Home Administrators in 1978.

HRP-0903269/9 PC **A03**/MF **A01**
Nebraska State Dept. of Health, Lincoln. Div. of Health Data and Statistical Research.
Nebraska Health Manpower Reports: Optometrists 1978.
1978, 28p

This statistical report of Nebraska Optometry Manpower was compiled from questionnaires mailed to all Optometrists licensed by the State of Nebraska as of September 1, 1978. Such surveys and reports are produced annually for fourteen health professions by the Division of Health Data and Statistical Research, in order that timely, reliable, and comparable data concerning the supply, distribution, and other characteristics of health manpower in Nebraska may be made available to interested organizations and individuals within the State. In addition, information derived from these surveys is transmitted to the National Center for Health Statistics, a part of the Department of Health, Education, and Welfare, for inclusion in the Cooperative Health Statistics System at the national level. This report contains primarily summary data relating to Nebraska Optometrists in 1978.

HRP-0903270/7 PC **A02**/MF **A01**
Nebraska State Dept. of Health, Lincoln. Div. of Health Data and Statistical Research.
Nebraska Health Manpower Reports: Physical Therapists 1978.
1978, 21p

The data contained in this report were collected by questionnaires mailed to each Physical Therapist licensed by the State of Nebraska as of December 1, 1978. The total number of licensed Physical Therapist on this date was 320, of whom 205 were either employed in Nebraska or retired and residing in Nebraska. These 205 Physical Therapists - and, more specifically, the 193 who were employed in Nebraska on the above date - constitute the statistical population for the major portion of this report. Annual surveys of fourteen licensed health professions are conducted by the Division of Health Data and Statistical Research of the State Department of Health, in order that timely and reliable data concerning the supply, distribution, and characteristics of health manpower in Nebraska may be made available at the State and local levels. In addition, information from these surveys is forwarded to the National Center for Health Statistics for inclusion in the Cooperative Health Statistics System at the national level.

HRP-0903274/9 PC **A07**/MF **A01**
Peoria School of Medicine, IL.
A Statistical Profile of Population, Health, and Health Resources Characteristics in Region 1B: Ambulatory Care Study Part I,
Peter J. DeGuire, and Jean C. Aldag. Sep 78, 129p
See also HRP-0903275 and HRP-0903276.

This report examines a large volume of data on demographic, socioeconomic and health characteristics of the Region 1B population and various aspects of the health delivery system, including health resources and selected health care expenditures and utilization statistics. Whenever possible, these data were assembled for the State, Region and individual counties within the Region to permit comparisons between geographic areas. The main purpose of this investigation was to assess the relative status of the Region 1B population and subpopulations on various indicators relevant to the need for health services and resources. Each of the seven sections of this report consists of a summary of major findings, statistical tables and a brief expository text for each table. The intent of this report was primarily descriptive, so the major focus of the analysis of the data was on identifying general patterns, the most salient characteristics and variations between and among geographic areas, population groups and time periods.

HRP-0903275/6 PC **A06**/MF **A01**
Peoria School of Medicine, IL.
A Survey of the Use and Need for Health Services Among the Population of a 13-County Area in Region 1B: Ambulatory Care Study Part II,
Peter J. DeGuire, and Jean C. Aldag. Sep 79, 119p
See also HRP-0903276 and HRP-0903274.

This report presents the results of a household sample survey which was conducted from May through July in 1978. This survey has produced information which was previously unavailable on the health and the utilization of health services among the population of a 13-county area in Region 1B. The main elements of this study will describe the types and volume of health care received, the characteristics of users, consumer satisfaction with various aspects of care and health status indicators. Most of this analysis focused on care received from a physician on an outpatient basis. This report is the second in a series of studies which are primarily intended to guide the development of an ambulatory teaching facility by the Peoria School of Medicine. It is also hoped that the information generated by these studies will be of use to all persons concerned with planning health services and resources in this area.

HRP-0903276/4 PC **A05**/MF **A01**
Peoria School of Medicine, IL.
A Survey of the Practice Characteristics and Work Patterns of Physicians Within a 13-County Area in Region 1B: Ambulatory Care Study Part III,
Peter J. DeGuire, and Jean C. Aldag. May 80, 86p
See also HRP-0903274 and HRP-0903275.

This is third report in a series of studies which are intended to serve as a basis for the planning and development of ambulatory programs at the Peoria School of Medicine. This report provides data, which were derived from a sample of the population, on the patterns and perceptions of care received and the health status of consumers of health services in this area. In the consumer survey, it was found that 85% of the population of this area contacted a physician on an outpatient basis during the year. Data on the practices and the care provided in the offices of physicians, therefore, constitute a crucial component of the information base needed to describe the structure and process of health care delivery in this area. Most of the data assembled in this report have not been available previously. It is hoped that the information presented in this report will benefit other local professionals in the health field who are involved in the analysis, development and provision of health services.

HRP-0903277/2 PC **A03**/MF **A01**
Southern Illinois Univ., Carbondale.
A Guide to the Delineation of Medical Care Regions, Medical Trade and Hospital Service Areas,
Margot Wiesinger Smith. May 79, 31p

This paper is a description of a method for the delineation of medical care regions, medical trade areas and hospital service areas as they are characterized by the flow of trade. The population base of an area may be estimated (after it is delineated) by combining Census Tracts, County Census Divisions, and state, county and city population data.

HRP-0903280/6 PC **A15**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Massachusetts Health Care Expenditures Fiscal Years 1973-1977: A Report of the Massachusetts Funds Flow Project,
Anestis J. Ghanotakis, and Helena Queeley. 15 Nov 80, 334p

This report is one in the series of reports of the Massachusetts Funds Flow Project. That project is an ongoing effort of the Office of State Health Planning of the Massachusetts Department of Public Health, with the assistance from other state agencies and the state's Health Systems Agencies (HSAs), to describe and analyze health expenditures in the Commonwealth. The Funds Flow reports are tabulations of health expenditures by source and type of expenditure, initially for fiscal years 1973 to 1976. They compare the relative magnitudes and trends among categories of health expenditures, and compare Massachusetts health expenditures with national levels.

HRP-0903281/4 PC **A04**/MF **A01**
Policy Analysis, Inc., Brookline, MA.
California Site Visit Report: Certificate of Need Evaluation Working Paper No. 1,
Gilbey Kamens, James Kanak, and Nancy Worthington. Feb 79, 63p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Urban Systems Research and Engineering, Inc., Cambridge, MA. See also HRP-0903282.

California has had two Certificate of Need programs. The first, enacted in 1969, was a weak program that covered relatively little and was administered regionally. It did, however, establish a precedent, which was considerably expanded in a new law, passed in 1976 and subsequently amended in 1977. The second Certificate of Need program, which was centralized at the state level, consists of two processes. One category of projects, mostly involving new beds or equipment, requires Certificate of Need approval. Another category of projects, involving replacement or renovation of existing facilities, is exempted from C/N review. Expenditures for the latter category, which was exempted because of active industry lobbying, amount to far more each year than costs for the reviewable category of projects. Most observers agree that if the state is to conform to the provisions of P.L. 93-641, it will be necessary to amend the existing law considerably further.

HRP-0903282/2 PC **A05**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Illinois Site Visit Report: Certificate of Need Evaluation Working Paper No. 2,
Donald Cohodes, and Alan Pardini. Feb 79, 80p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Policy Analysis, Inc., Brookline, MA. See also HRP-0903283.

On August 27, 1974, Illinois Public Act 78-1156 was enacted. This law established the Illinois Health Facilities Planning Board (IHFPB) for the purpose of implementing a Certificate of Need program for all major health care facility capital expenditures. The passage of this law culminated a ten year effort on the part of the State Department of Public Health, Blue Cross/Blue Shield, the Illinois Hospital Association and a number of state legislators.

HRP-0903283/0 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Maryland Site Visit Report: Certificate of Need Evaluation Working Paper No. 3,
Martin Chin, and Elizabeth Mulcahy. Mar 79, 53p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Policy Analysis, Inc., Brookline, MA. See also HRP-0903284.

Maryland's Certificate of need (C/N) program has reached an important crossroads in terms of development of credibility among providers and others interested in health care regulation. The program went through a long period of very slow development where planning agencies familiarized themselves with the issues, but lacked technical or political resources to evaluate or control resource growth. With the reorganization to PL 93-641 structures, the state agency and the HSAs now have the procedures and criteria in place which allow them to perform adequate technical analysis. However, the long history of planning's impotence and the lack of political resources make it unclear whether the C/N program can ever have more than a margina impact on resource allocation.

HRP-0903284/8 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Massachusetts Site Visit Report: Certificate of Need Evaluation Working Paper No. 4,
Donald Cohodes, Alan Cohen, Alen Pardini, and Martin Chin. Oct 78, 62p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Policy Analysis, Inc., Brookline, MA. See also HRP-0903285.

Massachusetts' DON program has been in the forefront of all C/N programs since its beginnings in 1974. The program has a reputation for toughness, seemingly verified by all interviewed observers. Most recently, 7/11/77 to 3/78, 81 applications were acted upon, 67 were approved (83%) and 14 were denied (17%). A more detailed breakdown of the 1972-76 DON decisions for acute-care hospitals is included in the report. According to the staff of the DON agency, the 'savings' from the program total $2.9 billion (assuming that denied and withdrawn projects would otherwise have been built and operated over a standard 40 year life as planned).

HRP-0903285/5 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Minnesota Site Visit Report: Certificate of Need Evaluation Working Paper No. 5,
Donald Cohodes, and Alan Pardini. Nov 78, 69p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Policy Analysis, Inc., Brookline, MA. See also HRP-0903286.

Minnesota is a state which will cause even the most entrenched cynic to reconsider his/her view of the merits of planning in health care. In the face of evidence from other settings that planning is not functioning well, Minnesota has somehow found the formula to make it work. The pieces which fit together to create this situation are not easily quantified. In the first place, much of the success in health planning in Minnesota can be attributed to, as one observer put it, 'the political culture' of the state. Minnesota has a long tradition of community planning and consensus building. There is a willingness on the part of all participants to listen and reason together. The environment is strongly supportive of cooperative efforts. Consumer groups and the media actively endorse the planning philosophy. Providers too, have not only accepted planning as a way of life, they have embraced it.

HRP-0903286/3 PC **A04**/MF **A01**
Policy Analysis, Inc., Brookline, MA.
New Jersey Site Visit Report: Certificate of Need Evaluation Working Paper No. 6,
James Kanak, and Nancy Worthington. Feb 79, 67p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Urban Systems Research and Engineering, Inc., Cambridge, MA. See also HRP-0903287.

New Jersey's Certificate of Need Program has been operational since 1971. The enabling legislation was passed in May of 1971, but did not take effect until August of the same year, some three months later. During this lag, a number of facilities were able to obtain exemptions from the review process. According to one source, the lag allowed applications for 2108 new beds, submitted by 20 hospitals, to be exempted from C/N review. An estimated one thousand hospital beds were added in areas where planners had already identified a surplus, as a result.

HRP-0903287/1 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
North Dakota Site Visit Report: Certificate of Need Evaluation Working Paper No. 7,
Alan Pardini, and Donald Cohodes. Dec 78, 52p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Policy Analysis, Inc., Brookline, MA. See also HRP-0903288.

The Certificate of Need program in North Dakota is characterized by a high project approval rate, strong provider domination of the project review process and generally ineffectual consumer representation. The original C/N statute was enacted in 1971 due largely to the support of the state's providers, notably the Hospital Assocation. Their support of C/N developed as federally mandated programs seemed imminent. The legislation, which providers supported, and which eventually became law, was a weak, manipulable statute subject to wide interpretation in implementation. The program which has evolved from the original law has only recently shed the 'paper tiger' role and has started to take on a more planning- and regulation-oriented stature.

HRP-0903288/9 PC **A04**/MF **A01**
Policy Analysis, Inc., Brookline, MA.
Rhode Island Site Visit Report: Certificate of Need Evaluation Working Paper No. 8,
Joan Sizer, and Nancy Worthington. Jan 79, 67p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Urban Systems Research and Engineering, Inc., Cambridge, MA. See also HRP-0903289.

Rhode Island was one of the first states to adopt a Certificate of Need program. The law, passed in 1968, grew out of the recommendations of a special legislative Commission appointed to investigate hospital room rates, primarily how they were affected by unoccupied beds. The law, which was fashioned on the concept of franchising hospitals, created a Health Services Council to review C/N applications and to advise the Director of Health as to their disposition. The new program was very slow to get on its feet for a variety of reasons, including a lack of budget, staffing and leadership. Implementation of the program as it currently exists did not really take place until 1972, when formal procedures were adopted and full-scale reviews began.

HRP-0903289/7 PC **A04**/MF **A01**
Policy Analysis, Inc., Brookline, MA.
South Carolina Site Visit Report: Certificate of Need Evaluation Working Paper No. 9,
Helena Reilly, and Nancy Worthington. May 79, 52p
Contract PHS-HRA-231-77-0114
Prepared in cooperation with Urban Systems Research and Engineering, Inc., Cambridge, MA. See also HRP-0903290.

South Carolina was the first southern state to adopt a Certificate of Need program, although the forces leading to its adoption there were seemingly much the same as those at work in states geographically removed and economically different from it. In South Carolina, the enabling legislation was initially proposed by the state Hospital Association (SCHA), which steered it through the legislature. Primarily, the Association was interested in encouraging better planning by hospitals, was concerned about the threat of competition from private entrepreneurs (particularly for-profit organizations or individuals), and thought it saw the writing on the wall with regard to federal intervention if regulatory action were not taken at the state level.

HRP-0903303/6 PC **A04**/MF **A01**
Massachusetts Dept. of Public Health, Boston.
Cancer Control: A State Health Plan for Massachusetts,
Lucinda G. Lagasse, and Thomas B. Devins. Jun 80, 68p
Grant NO1-CA-16408-03S1
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

As a result of the dramatic change in mortality and morbidity patterns since the turn of the century, cancer has assumed a rank as one of the highest

public health priorities during the past several decades. In spite of significant improvements in our ability to treat and cure several kinds of cancer there has been a slow but steady increase in the incidence and mortality rates of other cancers, in particular lung cancer. Cancer remains the second leading cause of death in Massachusetts and nationally; within Massachusetts 22.4% of deaths in 1977 were due to cancer. Nationally, it is estimated that one out of every four persons now living will eventually die of some kind of cancer, and that over the years, cancer will strike in approximately two of every three families.

HRP-0903312/7 PC **A04**/MF **A01**
Ohio Dept. of Health, Columbus. Health Planning and Development Agency.
Rural Health Care Development in Ohio; A Qualitative Analysis.
Data analysis series no. 3,
Barbara J. Cooke. Jan 81, 75p
Grant PHS-05-P-000296-BP-P25

Although problems of rural health care have been addressed by the government and the public sector, many rural Ohio areas remain underserved. With the potential physician surplus, it is important to identify these areas and to foster expansion of delivery systems in these rural areas. The recruiting of physicians to rural areas is affected by the actual process of choosing a practice location, the existing medical system, and the extent of recruitment activities. The characteristics of the population, its health care resources, and existing sociopolitical forces are among the factors which shape a rural health care delivery system. Although Ohio's rural population has grown at a faster rate than its urban population, physicians and health care facilities remain concentrated in metropolitan areas. This disparity between need and access to care in rural areas can be remedied through efforts of appropriate state agencies. Activities such as technical assistance in order to solicit grant monies, assistance in constuction of primary care centers and other facility development, and selective funding to medical schools all affect the availability of services. In addition programs to ensure maximum effectiveness and to prevent duplication of services. Maps, tables, notes, and bibliographies are included.

N81-26693/4 PC**$7.00**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 220, June 1981.
Jun 81, 53p NASA-SP-7011(220)

Approximately 137 reports, articles, and other documents introduced into the NASA scientific and technical information system in May 1981 are recorded, covering a variety of topics in aerospace medicine and biology.

PB81-213696 PC **A03**/MF **A01**
Victoria Univ. of Manchester (England). Dept. of Geriatric Medicine.
Medical, Social and Psychological Aspects of Stroke in Elderly Patients (Extracts from Final Report),
Nell Lane. Oct 80, 46p

The main aims of the research were: to identify the pathways of medical care and rehabilitation followed by patients who had suffered a fresh stroke; to study the options available to general practitioners and the factors influencing their choice among these options; to relate the treatment given to the patient to his clinical and social background; to determine outcome in terms of independence and health by the end of one year from the onset of the stroke; to relate the outcome to the care which has been given; and on the basis of all these findings to determine the optimum medical care pathways and further research which may be needed in developing these.

PB81-213936 PC **A10**/MF **A01**
Industrial Relations Research Association, Madison, WI.
The Union Impact on Hospitals, A National Study,
Brian E. Becker, Glen G. Cain, Catherine G. McLaughlin, Richard U. Miller, and Albert E. Schwenk. Jan 81, 206p
Grant PHS-HS-02661

Contests:
- Introduction and executive summary;
- Economic and institutional background;
- Economic theory and econometric background;
- Estimation of the effect of Unionism on wages with individual-worker characteristics from the current population survey, 1973-1976;
- Estimation of the effect of unionism on wages with individual hospital data from the Bureau of Labor Statistic surveys, 1972 and 1975, and from a 1978 mailed questionnaire;
- Estimation of the effect of unionism on wages with SMSA data from the Bureau of Labor Statistics Surveys, 1966-1975;
- and The union impact on hospitals--the institutioal view.

PB81-213944 PC **A02**/MF **A01**
North Carolina Univ. at Chapel Hill.
A Study in Policy Activation: The Case of E.P.S.D.T. (Early and Periodic Screening, Diagnosis, and Treatment). Executive Summary.
Final rept. 1 Jun 79-31 May 80,
Rilla A. Murray. 1980, 13p NCHSR-81-132
Grant PHS-HS-03710
See also PB81-213951. Doctoral thesis.

Materials pertaining to the implementation of Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) under Medicaid provided a vehicle for approaching the dual objectives of this study: (1) to devise a framework for the study of policy implementation; and (2) to achieve improved understanding of the ways in which special interest groups participate in processes of implementation. A developmental research design was employed to document and analyze the involvement of organized special interests in negotiations for resources and influence associated with EPSDT from 1970 to 1978. Findings suggest that implementation of EPSDT was less a function of nominal policy (the law) per se than the balance of power among parties to its interpretation. Fundamental shifts in principles of policy are recommended which feature universal eligibility and adoption of measureable outcome objectives as guides to child health policy formulation and implementation. A framework for studying the behavior of organizations in policy implementation is presented which suggests that the behavior of interest groups is a function of both policy process and organization variables.

PB81-213951 PC **A11**/MF **A01**
North Carolina Univ. at Chapel Hill.
A Study in Policy Activation: The Case of E.P.S.D.T. (Early and Periodic Screening, Diagnosis, and Treatment).
Final rept. 1 Jun 79-31 May 80,
Rilla A. Murray. c1980, 230p NCHSR-81-131
Grant PHS-HS-03710
See also PB81-213944. Doctoral thesis.

Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) under Medicaid is the largest single publicly-sponsored child health program ever undertaken in this country. Created by unheralded sections of the Social Security Amendments of 1967, EPSDT aims to detect and treat correctable conditions in poverty level children and to re-screen children periodically to ensure the maintenance of good health. All persons under age 21 who are eligible for Medicaid are entitled to EPSDT services. At this time, approximately 12 million children are eligible for the program. Unlike other Medicaid services, EPSDT requires states to inform eligible persons about the program and to assure that services needed are available; as with other Medicaid services, payments to providers for services rendered are derived from a combination of state and federal financial support. EPSDT represents a significant extension of health care benefits to poor children as a matter of statutory right.

PB81-213969 PC **A04**/MF **A01**
Louisiana State Univ. Medical Center, New Orleans.
Mechanisms of Vascular Access Problems in Hemodialysis.
Final rept. 1 Oct 77-31 May 80,
F. M. Gonzalez, W. A. Rock, L. H. Hollier, R. C. Batson, and J. E. Pearson. 30 Apr 81, 73p AK-1-7-2226-F
Contract NO1-AM-7-2226

In an attempt to delineate factors responsible for graft failure, we have developed an experimental model in the Spanish Brush goat using subcutaneous grafts and implantable electromagnetic flow probes allowing sequential hemodynamic flow measurements and hematology/coagulation studies. Surgical implantation of bovine grafts (BG), reinforced bovine graft (RBG), Gore-Tex graft (PTFE), and Johnson & Johnson experimental Anisgraft (J&J) were performed on female goats. The grafts were placed in the carotid-jugular position with implantable electromagnetic flow probes placed around the grafts. Routine dialysis both in nephrectomized animals and those with functional kidneys were performed. Baseline flow rates in 12 animals averaged 1778 ml. per minute (range 520-2000). The gradual progressive decrease in blood flow was seen until thrombosis occurred. At necropsy, clotted grafts were observed to have junctional outflow stenosis due to neointimal hyperplasia. Coagulation studies were performed on goats with grafts in place with an without dailysis. Increased platelet activity was demonstrated in some goats with clotted grafts with loss of the biphasic response in platelet aggregation studies. The fibringen was significantly increased in functioning bovine grafts over control values. The remaining coagulation studies did not differ significantly from the control values.

PB81-213985 PC **A10**/MF **A01**
Inter Governmental Coordinating Committee Secretariat, Kuala Lumpur (Malaysia).
Joint IGCC/IFRP East and South East Asia Seminar on Regional Fertility Research Held at Bangkok, Thailand on 18-20 July 1979,
Somboon Vachrotai, Jae-Mo Yang, David A. Edelman, Edwin B. McDaniel, and Dibya Shree Malla. 1979, 220p AID-PN-AAH-605

The seminar was attended by 48 participants and resource persons and 11 observers, representing 10 countries of East and Southeast Asia. Its objectives were three-fold: (1) to provide a forum for exchange among health/fertility professionals of experiences and research either completed or ongoing in the participating countries; (2) to enhance their awareness of IFRP's activities; and (3) to help define regional needs in contraceptive safety research, introduction and transfer of new technology, and maternity health research. This report of the seminar summarizes its proceedings and group sessions, and contains the text of 29 papers--nine country papers and twenty professional documents.

PB81-215543 PC **A03**/MF **A01**
National Association of Community Health Centers, Inc., Washington, DC.
A Community Health Center Information Guide, Part 1.
Final rept. 30 Sep-31 Jul 80,
Mary Plaska, and William J. Manseau. Jul 80, 45p NCHSR-81-139
Grant PHS-HS-03404
See also PB81-215550, part 2.

The objective of the report is to provide Health Systems Agencies and State Health Planning and Development Agencies with syntheses and analyses of available research on the cost-effectiveness of community health centers for use in their planning recommendations and project review decisions; to provide a research design which HSAs may implement in their own communities to study such cost-effectiveness.

PB81-215550 PC **A06**/MF **A01**
National Association of Community Health Centers, Inc., Washington, DC.
A Community Health Center Information Guide, Part 2.
Final rept. 30 Sep-31 Jul 80,

Mary Plaska, and William J. Manseau. Jul 80, 116p NCHSR-81-140
Grant PHS-HS-03404
See also PB81-215543, part 1.

This report is a guide to information needed by planners and administrators in assessing the cost-effectiveness of community health centers (CHCs). The guide is the first resource to cover both published and unpublished research and related materials, done between 1965 and 1980, on the effectivess of CHCs. Included are research syntheses and an annotated bibliography focusing on the client groups served by CHCs and on the various administrative, programmatic, and resource considerations that affect both costs and quality of care. A schematic outline shows some of the major criteria used in evaluating CHCs, along with indicators and sources of those criteria. Also included is a detailed description of the unique functions and services that CHCs provide. The new guide provides a useful research framework for studying cost-effectiveness and should be especially useful to CHCs in planning recommendations and project review decisions.

PB81-215857 PC **A02**/MF **A01**
Washington Univ., Seattle.
Provider Response and Cost of Dentistry for the Elderly.
Executive summary rept. 1 Jul 78-31 Dec 79,
Peter Milgrom, Douglas Conrad, and H. Asuman Kiyak. May 81, 6p NCHSR-81/129
Grant PHS-HS-02179

This research estimates costs of providing dental care to the elderly under insurance. Results suggest that incremental changes in co-payment levels and comprehensiveness do not lead to increases in cost. These results are different than previously published estimates. Data are presented which is of value in designing cost-effective insurance benefits for the elderly. Other studies which are part of this research probed the sources of variation in dentist treatment planning prediction of dental need, and demand for services among the elderly.

PB81-215865 PC **A08**/MF **A01**
Washington Univ., Seattle.
Provider Response and Cost of Dentistry for the Elderly.
Final rept. 1 Jul 78-31 Dec 79,
Peter Milgrom, Douglas A. Conrad, and H. Asuman Kiyak. May 81, 174p NCHSR-81/130
Grant PHS-HS-02179

The purpose of this research was to estimate the costs of providing dental care to the elderly in an experimental setting using typical patient problems. Practicing dentists prepared treatment plans, constrained by patient and insurance resources. A total of 346 practicing dentists completed two treatment plans for one of seven prototypic patients The first treatment plan was made ignoring finances and served as a control for the individual dentist's treatment style; a second treatment plan was made under one of four insurance plans. The patients were selected to be broadly representative of types of problems presented by the elderly who have some teeth. The insurance plans are typical commercial plans without deductibles and carrying co-payment levels of from 50, 50, 50, to 100, 100, 100 for Class I (preventive diagnostic), Class II (basic restorative and surgical); and Class III (prosthetic) benefits.

PB81-216731 Not available NTIS
National Bureau of Standards, Washington, DC.
An Amine Accelerator for Colorfree Curing of Cold-Curing Methyl Methacrylate Denture Systems.
Final rept.,
H. Argentar, J. A. Tesk, and E. E. Parry. May 81, 2p
Contract PHS-DE-02159-02
Pub. in Jnl. of the American Dental Association 102, p664-665 May 81.

The various methacrylate denture systems used in dentistry employ differing amounts of amine accelerators for producing a cured denture. The most generally used amine is N,N-dimethyl-p-toluidine (DMPT). Upon curing, this imparts an undesirable yellow color to the resin, thereby rendering it impossible to obtain a satisfactory match of some shades between systems. A recently commercialized amine, N,N-dimethyl-p-t-butylaniline (DMBA), was tested and found to impart no color to specimens of denture resin as a result of the polymerization reaction. With the addition of a suitable quantity of a commercially available ultraviolet absorber, specimens containing DMBA exhibited satisfactory color stability when exposed to a sunlamp for 24 hours according to an American Dental Association specification for denture base resins. If used in a denture base formulation, DMBA has the potential of allowing consistent shading from one system to another. This is of value from economic as well as esthetic consideration.

PB81-217382 Mag Tape $845.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Mortality Multiple Cause of Death, Detail, 1977.
Data file,
Harry Rosenberg, and Joseph D. Farrell. 1977, mag tape NCHS/DF-81/007
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-126634, and PB81-217390.

Vital Statistics data relating to mortality provide demographic, underlying and multiple cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex and geographic area. Underlying cause-of-death data and multiple cause-of-death data have been coded to the causes shown in the Eight Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates are not on the tapes. The number of deaths and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States, Volume II, Parts A and B. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics. Multiple cause-of-death data at the 'each cause' level of detail is included as Appendix I of the multiple cause-of-death documentation.

PB81-217390 PC **A10**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Mortality Multiple Cause Data, Detail, 1977. Tape Contents and Documentation Package.
1977, 222p NCHS/DF-81/007A
For system on magnetic tape, see PB81-217382.

Vital Statistics data relating to mortality provide demographic, underlying and multiple cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex and geographic area. Underlying and multiple cause-of-death data have been coded to the causes shown in the Eight Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. The number of deaths and the death and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States.

PB81-218026 PC **A05**/MF **A01**
National Center for Health Services Research, Hyattsville, MD. Div. of Extramural Research.
Emergency Medical Services Systems Research Projects, October 1979-March 1981.
Management series rept.
Jun 81, 96p NCHSR-81-90

Summaries of research projects supported by the National Center for Health Services Research (NCHSR) from October 1, 1979 - March 31, 1981, under authority of Section 1205 of the Emergency Medical Services Act. Also included are lists of: (1) EMS-related research projects supported under authority of Section 305 of the Public Health Service Act; and (2) publications resulting from EMS research supported by NCHSR.

PB81-218034 PC **A04**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Health Care Financing Program Statistics. Medicare: Health Insurance for the Aged and Disabled; Selected State Data, 1973-1977,
Martha L. Happel. 1981, 64p HCFA/PUB-03059

The report includes data on number of Medicare Beneficiaries, amounts reimbursed, participating facilities, inpatient hospital and skilled nursing facility admission, average charges, and average length of stay, for 5 fiscal years.

PB81-218265 PC **A05**/MF **A01**
Center for Health Economics Research, Chestnut Hill, MA.
Physician Behavior Under the Medicare Assignment Option.
Final rept.,
Janet B. Mitchell, and Jerry Cromwell. 30 Jan 81, 84p
Contract HCFA-500-78-0051

Policymakers have become increasingly concerned over the growing number of physicians who are unwilling to accept Medicare patients on assignment. The national sample of general practitioners, internists, and general surgeons confirmed this reluctance: Over one-quarter (28.2%) of survey physicians stated that they never accept assignment of any of their patients; a smaller number (18.9%) report that they always do. The remaining physicians pick and choose their assigned patients on a case by case basis. Econometric analysis showed that assignment rates were very sensitive to reimbursement and administrative practices under Medicare. A ten percent increase in the prevailing charge, for example, raised assignment by 14.7 percent. Higher carrier rates of reduction and higher claims denial and investigation rates significantly depressed assignment. The assigned and nonassigned components of the Medicare program were found to compete with each other; assignment rates were lower where the demand for nonassigned services was stronger. As for the kinds of physicians who take assignment, they were disproportionately general surgeons and foreign medical graduates.

PB81-218752 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Cost-Effectiveness Analysis and U.S. Department of Agriculture Nutrition Education Programs.
Staff rept.,
Jon P. Weimer. Apr 81, 23p AGESS-810420

Of the three USDA programs reviewed that have a nutrition education component, only one appears to lend itself immediately to cost-effective analysis--the Expanded Food and Nutrition Education Program. The other two programs (Nutrition Education and Training, and the Special Supplemental Food Programs for Women, Infants, and Children) are each characterized by a myriad of local education efforts which, individually, do not seem to subscribe to cost-effectiveness analyses but, collectively, may permit comparing alternative nutrition education strategies if result indicators and cost data can be assembled from selected sites.

PB81-218844 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.

A First-Order Characterization of Clinical Trials.
Final rept.,
Marsha D. Hopwood, John C. Mabry, and William L. Sibley. c1980, 100p R-2653-NIH, NIH/DRR-77-2
Contract N01-RR-8-2122

This report presents a broad characterization of clinical trials, their organizational, administrative, and operational problems, and some tentative solutions. It reports the results of the first year of a two-year project entitled 'Evaluation of the Role of Clinical Research Centers in Clinical Trials, with Emphasis on Information Processing.' The second year of the project focused on the clinical trials role of the General Clinical Research Centers (GCRCs) sponsored by the National Institutes of Health (NIH), and recommended methods to facilitate trials that make use of the resources provided in the GCRCs. The clinical trials of interest for this broad characterization are primarily those sponsored by the NIH. The NIH Inventory of Clinical Trials for fiscal years 1975 through 1978 lists between 782 and 1,065 active trials each year, more than half of which were supported by the National Cancer Institute (NCI).

PB81-219016 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Family Planning Clinics Can Provide Services at Less Cost but Clearer Federal Policies are Needed.
19 Jun 81, 85p HRD-81-68

In fiscal year 1980, the Department of Health and Human Services spent about $375 million for family planning services through several programs. The Department could reduce the costs of such programs and make services less costly and more attractive to clients without compromising quality care by eliminating unnessary medical procedures or tests. The cost of the title X program could be further reduced by more vigorously enforcing fee collections to ensure that only needy persons receive free or subsidized services. Also, the Department needs to resolve conflicts in fee policies between the title X program, which requires fee collections from persons with ability to pay, and the title XX program, which permits free service regardless of client income.

PB81-219255 PC **A06**/MF **A01**
Alabama Univ., University.
Psychosocial Influences on Patterns of Prenatal Care Among Rural Alabama Black Women.
Final rept.,
Anna Kline, and Elizabeth Meese. May 81, 113p MCH/CCS-81/04
Grant PHS-MC-R-010429

The purpose of the study was to obtain a better understanding of the bases underlying the decisions of rural Black women regarding health care during pregnancy. Subjects of the study were 208 Black pregnant women residing in six rural counties in West Alabama. Data were obtained by means of two interviews conducted with each woman during her pregnancy and within one month following the delivery of her baby. The level of knowledge possessed by participants in the study about the physical changes and health care requirements of pregnancy was found to be seriously limited. One consequence of this was that women frequently responded inappropriately to symptoms they experienced during pregnancy, failing to refer potentially serious symptoms to a physician for treatment. At the same time it was found that their responses to symptoms experienced depended upon their perceptions of the severity of those symptoms - symptoms perceived as serious were referred to a physician for treatment while those perceived as not serious, or normal, were self-treated. Because of frequent misinterpretations of severity, however, many potentially serious symptoms were never reported to a physician.

PB81-219818 PC **A04**/MF **A01**
Chinese Medical Association, Beijing.
Chinese Medical Journal. Volume 94, Number 5, May 1981.
May 81, 67p
See also Volume 94, Number 4, PB81-204752, PB81-219826, PB81-219834, and PB81-219842.

Contents:
- History and present status of modern psychiatry in China;
- Laser vaporization in intracranial tumors;
- Drilling of OS calcis in persistent painful heel;
- Ultrastructural investigation of experimental fracture healing--IV. electron microscopic observation on transformation and fate of fibroblasts and chondrocytes;
- Hydroxypiperaquine phosphate in treatment of falciparum malaria;
- Hydroxypiperaquine phosphate in treating chloroquine resistant falciparum malaria;
- Surgical treatment of carcinoma of the esophagus--report of 1,647 cases;
- Chemotherapy and its combination with corticosteroids in acute miliary tuberculosis in adolescents and adults--analysis of 55 cases;
- Long-term results of the transsphenoidal approach in removing intrasellar tumors;
- Electronmicroscopic observations of traditional Chinese medicine influence on changes in platelet aggregation in central retinal vein occlusion;
- Double cervix adenocarcinoma--a case report;
- A case report of esthesioneuroblastoma;
- Further research on hepatitis B vaccine;
- Preliminary report on the average spectral method in investigating the singing voice;

and Chinese medical literature.

PB81-219826
(Order as PB81-219818, PC **A04**/MF **A01**)
Shanghai First Medical Coll. (China). Huashan Hospital.
Laser Vaporization in Intracranial Tumors,
Gongbai Chen. 1981, 5p
Included in Chinese Medical Jnl., v94 n5 p283-287 1981.

Good results are reported with laser vaporization of 9 cerebral tumors or their adherent remnant tissue, no recurrences had occurred within 6 months of surgery.

PB81-219834
(Order as PB81-219818, PC **A01**/MF **A01**)
Chinese Academy of Medical Sciences, Beijing. Cancer Inst.
Surgical Treatment of Carcinoma of the Esophagus, Report of 1,647 Cases,
Guojun Huang, Dawei Zhang, Guoqing Wang, Hua Lin, and Liangjun Wang. 1981, 19p
Included in Chinese Medical Jnl., v94 n5 p305-307 1981.

Recent progress in the surgical treatment of carcinoma of the esophagus may change somewhat the pessimistic philosophy for this malignancy. The results of 1,647 cases are encouraging though not satisfactory. With reasonably early diagnosis, proper selection of patients, good pre- and postoperative care, and judicious use of radiation and other adjuvant therapy, further improvements in both palliation and curability of this disease are possible.

PB81-219842
(Order as PB81-219818, PC **A04**/MF **A01**)
Beijing Medical Coll. (China).
Further Research on Hepatitis B Vaccine,
Qimin Tao, Jinqi Wang, Baifang Feng, Xinfu Li, and Zhicai Du. 1981, 5p
Included in Chinese Medical Jnl. v94 n5 p329-333 1981.

With successful production of a safe, economical hepatitis B (HB) vaccine, the authors recommend large scale immunization programs to control the disease.

PB81-220634 PC **A02**/MF **A01**
Columbia Univ., New York.
A Checklist for Evaluative Overviews of Family Planning Program Activities.
Manual no. 6,
Jack Reynolds. Jan 73, 23p AID-PN-AAH-475
Contract AID/csd-2479
Manuals for Evaluation of Family Planning and Population Programs.

Program evaluations should be objective, systematic, comprehensive, and useful. They should be objective in the selection of topics; systematic in approach; inclusive of all studies of program activities; and establish a link between evaluation and planning. Family planning program evaluations do not always satisfy these criteria. Current family planning evaluations are frequently limited to clinic service statistics and Knowledge-Attitude-Practice sample surveys. To remedy these lapses, this report outlines the essential components of a comprehensive evaluation of family planning program activities.

PB81-221525 PC **A02**/MF **A01**
Washington Univ., St. Louis, MO. School of Medicine.
Effects of Exercise Training on Lipid and Carbohydrate Metabolism in Hemodialysis Patients.
Annual rept. 1 Oct 79-30 Sep 80,
Andrew P. Goldberg. 2 Jun 81, 23p AK-1-9-2221
Contract N01-AM-9-2221
See also PB80-161623.

A longitudinal study has begun in 14 hemodialysis patients to determine the effects of exercise training on their lipid and carbohydrate metabolism, cardiovascular function, hypertension, anemia, and psychological state. All patients underwent a thorough medical and cardiovascular evaluation prior to entry to insure that none had a disability which would be a contraindication to exercise, and to evaluate their baseline thyroid function, hematologic status, and level of physical fitness. The screening exercise test was a modification of the standardized Bruce protocol. If there were no side effects or abnormal cardiovascular responses during the test, patients entered the protocol. Twelve patients underwent complete evaluations of lipid and carbohydrate metabolism, and 7 hypertensive patients were studied in detail. Investigations included determinations of: (a) lipoprotein and apoprotein profiles; (b) triglyceride turnover rates, lipoprotein lipase activities, intravenous glucose tolerance, and insulin receptor binding, number and affinity; (c) cardiac output, peripheral vascular resistance and ejection fraction; (d) catecholamine, renin, insulin, and glucagon levels; and (e) plasma volume and red cell mass. All patients had baseline psychological profiles, including assessments of mood, health beliefs, and participation in pleasant events. Dietary assessments were performed to determine their caloric intake, the composition of their diet, their cholesterol intake and P/S ratio. Six patients served as 6 month no-exercise controls and 8 began exercising immediately.

PB81-221780 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper No. 2: Case Studies of Medical Technologies. Case Study No. 5: Periodontal Disease. Assessing the Effectiveness and Costs of the Keyes Technique,
Richard M. Scheffler, and Sheldon Rovin. May 81, 44p OTA-BP-H-9(5)
See also PB80-216864. Library of Congress catalog card no. 80-600161.

Researchers can point to mounting evidence that dentistry is gaining the scientific knowledge that will provide the public some measures for the prevention and management of periodontal disease. Dentistry has repeatedly demonstrated its willingness to support major public health efforts. Dental researchers and practitioners have actively participated in the development of the scientific base, clinical applications, and promotion of measures to control dental caries through the use of fluoride and, more recently, sealants. Now the dental research community is seeking to conquer caries totally by developing a caries vaccine. Research towards this goal is being carried out at a number of research centers, supported cooperatively by universities and the National Institutes of Health. While our scientific knowledge base for periodontal disease may lag behind that for caries, significant advances have been made in the last decade and a half by a diverse and dedicated group of scientists and concerned clinicians.

PB81-222523 PC **A22**/MF **A01**
Social Security Administration, Baltimore, MD. Office of Research and Statistics.
Current Medicare Survey Reports 1-31: July 1967-April 1976.
Statistics rept, 1966-77.
Dec 77, 502p
See also 1973, HRP-0024175.

From July 1966 through December 1977 a continuing monthly survey of a sample of Medicare beneficiaries was conducted. This survey was known as the Current Medicare Survey and it collected current estimates of medical care services and charges and information about the use of non-covered health care services and charges as, dental care, etc. This survey is no longer being conducted. The professional staff who directed this effort published the results in the form of a series of 'notes'. There were 31 such notes beginning in July of 1967 and continuing for nearly 9 years until April of 1976. The entire 31 unit series is collected in this document for the use of interested persons.

PB81-222986 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
Comparative Study of the Medical-Legal Aspects of Post-Vaccination Complications in the Member States of the European Community (Etude Comparative des Aspects Medico-Legaux des Complications Post-Vaccinales dans les Etats Membres de la Communaute Europeenne),
J. M. Auby. c1981, 135p EUR-7019-FR, ISBN-92-825-2137-0
Text in French.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The significant frequency of post-vaccination accidents has led the Commission to look into the provisions covering the responsibility for the rehabilitation and compensation of victims. This concern arose from the provisions of article 118 of the European Economic Community and is all the more justifiable in that the health authorities of the Member States recommend (if not compel) all individuals of the population, or certain groups of persons, to undergo specific vaccinations against various specified diseases. In order to harmonize the legislative measures advocated in the aforementioned article and because of the free circulation of people across frontiers, it appears necessary to identify the different rehabilitation and compensation clauses in the countries of the European Community. A detailed description of the national systems in force is given which should make it possible to eliminate any existing legislative gaps from present national procedures or relevant legal practices.

PB81-223018 PC **A04**/MF **A01**
Hodge (Melville H.), Saratoga, CA.
Health Planning Review of Medical Information Systems.
Research rept. series 30 Sep 78-30 Jun 80,
Melville H. Hodge. May 81, 73p DHHS/PUB/PHS-81-3303, NCHSR-81-65
Grant PHS-HS-03347

This report is written in the form of a guidebook aimed at two audiences--Health Systems Agency staff or board members who must review Certificate-of-Need (CON) applications for hospital medical information systems; and, hospital executives who must prepare and submit such applications. The methododology used in preparing this document was to synthesize existing research and experience. Emphasis was placed on developing a highly readable guidebook for non-technically trained personnel rather than a formal review paper. A survey was made of all Health Systems Agencies, resulting in the review of 74 medical information systems CON applications. Total U.S. hospital expeditures for all such systems was estimated to be $200 million per year with an acquisition of medical information systems. Since each review organization has considerable latitude in establishing review forms, procedures, etc., the guidebook was prepared to deal with issues of substance rather than form. Emphasis has been placed on cooperation between the review agencies and hospitals to achieve the common purpose of acquiring only those medical information systems which will serve the public interest as defined by legislative and regulatory criteria.

PB81-223281 PC **A04**/MF **A01**
Department of Health, Wellington (New Zealand). Hospital Design and Evaluation Unit.
Accommodation for Severely Physically Disabled Persons: A Study of the Requirements for Those in Need of 24 Hour Care.
Rept. no. 9,
1980, 75p

This report is concerned with the provision of design guidelines for accommodation for the relatively small number of very heavily dependent, younger physically disabled persons who, over long periods, require access to nursing care throughout the 24 hours of each day. They fall into a wide range of ages, the majority being between 13 years to 60 years of age with a tendency to cluster about 30 years of age. The common factor is very heavy physical dependence. The provision of hostel and 'family home' accommodation without night staff for those who are not so heavily dependent is a separate issue which is not considered in this report.

PB81-223307 PC **A08**/MF **A01**
Chicago Univ., IL.
The Impact of Family Planning Programs on Fertility Rates: A Case Study of Four Nations,
Jay Teachman, Donald J. Bogue, Juan Londono, and Dennis Hogan. c1979, 164p AID-PN-AAH-476
Contract AID/pha-C-1108
Library of Congress catalog card no. 79-51147.

Documentation that family planning programs are capable of inducing major and rapid decline in fertility is still quite scarce. This monograph tests hypotheses linking family planning programs to changes in fertility by assembling data for four specific LDCs, Columbia, Thailand, Indonesia, and Korea.

PB81-223489 PC **A11**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Trends in State Administration of Medicaid Programs,
David F. Chavkin. 1978, 237p

This report discusses state trends in the following areas: (1) Potential changes and trends in eligibility criteria for Medicaid, including income criteria, resource criteria, use of 'Ribicoff Children Option',coverage of unborn children, coverage of AFDC-UF families, operation of spenddown, and the 209(b) option. (2) Comparison of the use and operation of the spenddown provision among states, including changing income lines or operation of spenddown, whether the spenddown provision under the 209(b) option is operated the same as the medically needy program, what groups use the spenddown, how the public is informed about it, and how it is administered. (3) Current and potential benefit restrictions under medicaid, including limits being considered on amount of service, changes in coverage of optional services, whether copayments are being imposed and if so at what level and on what services, and whether prior authorization is being imposed. (4) Activities within States to restrict payment of hospital, physicians, or other services.

PB81-223554 PC **A02**
Hawaii Univ., Honolulu. Dept. of Physiology.
Determination of Catheter Wall Heat Transfer in Cardiac Output Measurement by Thermodilution,
M. E. Kim, and Y. C. Lin. c1980, 9p UNIHI-SG-JC-80-1-, NOAA-81051104
Grant NOAA-04-7-158-44129
Pub. in Clinical Experimental Pharmacology and Physiology, v7 p383-389 1980.

A model system of the thermal dilution technique was used to determine in vitro the loss of thermal indicator across different sizes of polyethylene catheters. Thermal indicator loss (caloric gain by the indicator fluid or caloric loss by the catheter) per unit length of catheters increased as a function of the outer radius of the catheters. This study indicates that there is a measurable loss of thermal indicator during injection corresponding to a loss of between 9 and 16% (for a 11.5 cm length of PE 50 and PE 240) of the required calories for warming the injectate to 37C. Data is provided for correction of heat loss across the wall of a given length and diameter of polyethylene tubing.

PB81-223984 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
DOD Needs Better Assessment of Military Hospitals' Capabilities to Care for Wartime Casualties.
Rept. to the Congress.
19 May 81, 54p HRD-81-56

This report discusses Department of Defense planning efforts to provide medical facilities for American casualties who would be returned to the United States for medical care in the event of a war in an overseas area. The report discusses design alternatives that would improve the mobilization capacity of military hospitals constructed in the future, and it recommends ways to improve planning for the use of existing facilities.

PB81-224149 PC **A02**/MF **A01**
National Center for Health Services Research, Hyattsville, MD. Div. of Extramural Research.
Hispanic Health Services Research: A Preliminary Bibliography.
Research report series,
Phillip Jaramillo. Apr 81, 22p NCHSR-81-70, DHHS/PUB/PHS-81-3300

This bibliography includes research on the financing, delivery and organization of health services for Hispanics. It is an accumulation of papers, primarily unpublished, prepared by authors at NCHSR and elsewhere. A listing of reports prepared for the first Hispanic Health Services Research Conference is included.

PB81-225369 PC **A03**/MF **A01**
University of Southern California, Los Angeles.
Prospective Study of Post Transfusion Hepatitis (Transfusion-transmitted Viruses Study),
James W. Mosley, Richard D. Aach, Gary L. Gitnick, F. Blaine Hollinger, and Wolf Szmuness.
30 Jun 81, 41p
Contract NO1-HB-4-2972
Prepared in cooperation with Washington University, St. Louis, MO., University of California, Los Angeles, CA., Baylor College of Medicine, Houston, TX, and New York Blood Center, New York.

To complete the analysis of major factors potentially influencing risk of non-A, non-B viral hepatitis, recipient characteristics were analyzed. Sex, age, prior transfusion, prior hepatitis B experience, and number of transfusions administered had no influence. The last finding seems explained by protective interaction among multiple units. In stepwise regression, only donor characteristics emerged as important. A donor characteristic not previously analyzed was subtype of hepatitis B virus strain among donors positive for antibody to hepatitis B surface antigen. The findings were negative except for a subgroup for whom age was more closely related to outcome.

PB81-862435 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thyroid Hormone Function. January, 1970-July, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jul 81.
Jul 81, 89p

This bibliography contains citations concerning thyroid function. Hormone response to infection, dietary intake, and stress is discussed. Treatment for thyroid toxicity, and therapy for thyroid tumors, are included. RIA development and evaluation are also covered. (Contains 64 citations fully indexed and includes a title list.)

PB81-871667 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

The Physiology of Decompression Sickness. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 150p

The physiology of decompression sickness is covered in terms of the effects on blood cells at hyperbaric pressures. Decompression effects due to dissolved gases, as well as the use of inert gases for minimization of bends are also discussed. The formulation of decompression tables based on mathematical analysis is also presented. (Contains 182 citations fully indexed and includes a title list.)

PB81-871980 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Allergy and Hypersensitivity. January, 1973-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 100p
Supersedes PB80-803455.

The cited articles in this bibliography cover the basic knowledge and new developments in food allergy and hypersensitivity. Included are studies of allergy among food workers, and methods for handling this problem. The allergenic potential of foods, food additives, and food packaging materials and finishes, the mechanisms involved, clinical manifestations and diagnosis, and treatments for food allergies and related hypersensitivities, are discussed. Specific articles on dyslexia, or learning disability, migraine, hyperactivity, and inattentivity in children, stomach cramps, rashes, and other frequently mentioned ailments sometimes related to diet, are also included. Sources of potentially allergy- producing components in human diets, arising from animal feed or fertilizers, are mentioned. (This updated bibliography contains 111 citations, 38 of which are new entries to the previous edition.)

PB81-929406 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Urinary Tract Cancers.
Special listing.
Jun 81, 81p NCI/ICRDB/SL-426
Supersedes PB80-929405.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Carcinogenesis and related biology; Epidemiological studies; Diagnosis and treatment; Other biology and pathology of renal and urological cancer; Immunological studies of bladder cancer; Broad studies and cooperative groups.

6F. Environmental Biology

CONF-810545-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Striped Bass and the Management of Cooling Lakes.
C. C. Coutant. 1981, 12p
Contract W-7405-ENG-26
Conference on waste heat management and utilization, Miami, FL, USA, 12 May 1981.

Striped bass, Morone saxatilis, is being introduced to freshwater reservoirs, some of which are used for power plant cooling. The thermal niche of this fish species changes with age and greatly influences its success. Juveniles, which prefer and grow optimally near 24 to 26 exp 0 C (75-80 exp 0 F), may thrive in cooling lakes. However, adults, which seek temperatures near 20 exp 0 C (68 exp 0 F) and exhibit poor growth and survival above 22 exp 0 C (72 exp 0 F), may not survive summer conditions. Striped bass management in cooling lakes should be guided by these thermal requirements. (ERA citation 06:024362)

DE81023668 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Impacts from Water Level Fluctuations on Fish in the Hanford Reach, Columbia River.
C. D. Becker, D. H. Fickeisen, and J. C. Montgomery. May 81, 63p PNL-3813
Contract AC06-76RL01830
Microfiche only after original copies are exhausted.

Observations on the effects of water level fluctuations in the Hanford Reach of the Columbia River, Washington, were made in 1976 and 1977. The two years provided contrasting flow regimes: high water and fluctuations of greater magnitude prevailed in 1976; low water and higher temperatures prevailed in 1977. Situations where fish and other aquatic organisms were destroyed by changing water levels were observed and evaluated each year in three study areas: Hanford, F-Area, and White Bluffs sloughs. Losses primarily were due to stranding, entrapment (with or without complete dewatering), and predation. Juvenile fish were more susceptible to entrapment and stranding than were adult fish. Estimates of actual losses were biased and conservative because relatively few fish could be found after each decline of water level and dewatering. The most valued species of fish affected by water level fluctuations at Hanford were the anadromus fall chinook salmon (Oncorhynchus tshawytscha) and the resident smallmouth bass (Micropterus dolomieui). Crucial periods for chinook salmon occurred during winter when incubating eggs were in the gravel of the main channel, and before and during seaward migration in the spring when fry were abundant in shoreline zones. The crucial period for smallmouth bass was during spring and early summer when adults were spawning in warmed sloughs and shoreline zones. Chinook salmon and smallmouth bass fry were vulnerable to stranding and entrapment, and smallmouth bass nests were susceptible to exposure and temperature changes resulting from repeated water level fluctuations. Thus, flow manipulation may be crucial to their survival. The extent to which other species of riverine fish were affected by water level fluctuations depended upon their use of shoreline zones for spawning and rearing young. (ERA citation 06:023258)

DE81024272 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Bacterial Analysis of Water and Sediment Samples.
A. J. Francis, H. L. Quinby, and G. R. Hendrey.
Mar 81, 20p BNL-51375
Contract AC02-76CH00016
Microfiche only after original copies are exhausted.

Water and sediment samples collected from the Monongahela River, WV, were analyzed for total bacteria by direct counts using epifluorescence microscopy and the lipopolysaccharide (LPS) content by the limulus amebocyte lysate assay. The population ranges of bacteria in water and sediment samples were 2.4 to 6.5 x 10 exp 6 /ml and 0.7 to 2 x 10 exp 10 /g dry weight, respectively. The bound LPS in water samples ranges from 3 to 17 ng/ml. Sediment samples contained 17 to 34 mu g of bound LPS/g dry weight of sediment. The relationship between bound LPS and bacterial cell number and the estimated bacterial carbon biomass by direct bacterial counts and LPS assay are discussed. The average ratios of the direct bacterial-count-derived carbon to the lipopolysaccharide-derived carbon for water and sediment samples were 1.03 +- 0.60 and 1.10 +- 0.53, respectively. (ERA citation 06:024207)

DE81024905 PC **A09**/MF **A01**
Minnesota Univ., Minneapolis.
Vertebrate Behavior and Ecology. Progress Report, June 1, 1980-May 31, 1981.
J. R. Tester, and D. B. Siniff. Jun 81, 188p DOE/EV/01332-T1, COO-1332-132
Contract AC02-76EV01332
Microfiche only after original copies are exhausted.

This report details progress on two subprojects: 1. Engineering design and development and 2. Ecological aspects of sea otters, grouse and fish. Engineering design and development focused on the refinement and adaptation of existing technology. This included the design of two types of implantable transmitters, the development of a more efficient sonic tag, the development of a computer compatable data recorder, and the support of ongoing projects. This recorder is designed to take data of a general nature, record it on cassette tape, allow the user to examine the data in the field and then transfer it to any general purpose computer for data analysis. Field efforts presented under Subproject II resulted in further information on activity patterns, movements and feeding behavior of sea otters in Alaska. California sea otter activity patterns were found to be highly variable among individuals and within an individual over time. A catalogue of sea otter behavior was developed and analyzed. Spruce grouse exhibited strong seasonal habitat preferences; winter habitat preference consisted of jack pine uplands, whereas, during the summer most females preferred coniferous lowlands. Ruffed grouse varied considerably in habitat utilization patterns in north-central Minnesota, with trembling aspen used extensively during winter months. (ERA citation 06:024173)

DE81024927 PC **A11**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Health and Environmental Effects of Synthetic Fuel Technologies: Research Priorities. Report to the Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies.
R. D. Brown. Apr 81, 229p MTR-80W348
Contract AC01-79EV10018
Microfiche only after original copies are exhausted.

This report is an assessment of the health and environmental effects research priorities related to coal gasification and liquefaction and oil shale development. It reflects the subjective judgments of well chosen research scientists in relevant disciplines. These scientists reviewed the results of workshops conducted in 1978 on coal gasification and liquefaction and oil shale, background information on related federal research, and comments by relevant federal agencies. The scientists prepared a listing of current research needs according to major areas of concern. These were categorized as to generic, region-specific, or process specific research. For the latter category, various scales of development were addressed for two exemplary processes: SRC (solvent refined coal) II and above ground oil shale retorting. Subjective judgments were used to prioritize the research tasks and assess the adequacy of current research. (ERA citation 06:023056)

DP-MS-81-47 PC **A09**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Interactive Effects of Temperature and Nutrients on Periphyton Assemblages from a Low-pH South Carolina Stream.
D. C. Brown. May 81, 178p
Contract AC09-76SR00001
Thesis. Submitted to Univ. of South Carolina, Columbia.

Periphyton that accumulated on glass slides in a flow-through, artificial stream system at the Thermal Effects Laboratory, Savannah River Laboratory, were studied for their response to continuously elevated temperatues and to nutrient additions. Although the stream water used in these experiments was low in nutrients, addition of nutrients rarely increased periphyton biomass or carbon-uptake rates. The most consistent stimulation occurred in July at 12 exp 0 C above ambient temperature. Large day-to-day variations in chlorophyll a and rate of carbon-uptake of the assemblages were observed at ambient temperatures and at elevated temperatures. Temperature and available carbon varied on approximately the same time scale as the algal parameters. It is concluded that nutrient imitation, if it exists in this system, is masked by the effects of temperature and, in summer, possibly by limitation of carbon to the periphyton. (ERA citation 06:024364)

PB81-216012 PC **A04**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Air Pollution Research Group.
Pesticides in the Environment: Their Behaviour, Distribution and Analysis,
I. Baunok. Apr 80, 54p CSIR-APRG/80/4

The term pesticide is applied to a wide range of chemicals of synthetic or natural origin and it includes insecticides, herbicides, fungicides, nema-

tocides, etc. Pesticides are employed to protect plants, animals and their products against destruction or competition by living organisms including insects, fungi, rodents, worms, plants, etc. Considering that food shortage is one of the main problems of mankind, there can be no doubt about the necessity of their use. The aims of this report are: To present the latest information on the toxicity, behaviour and distribution of pesticides in the environment; To review and discuss current analytical methods for the determination of pesticides in the atmosphere; To make suggestions for starting a research program on a study of the occurrence and behaviour of pesticides in the atmosphere of South Africa.

PB81-872103 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Uptake of Metals by Shellfish and Marine Plants in Polluted Waters. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 215p

The concentration of metals in shellfish and marine plants in polluted seawater is discussed. The toxicity levels and the long term effects on the ecology of the marine environment are presented. Included are topics on growth rates of marine life as a function of metal content, as well as the long term effects on the food chain. (Contains 205 citations fully indexed and includes a title list.)

UCRL-85367 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Hierarchical Set of Models for Estimating the Effects of Air Pollution on Vegetation.
J. R. Kercher, M. C. Axelrod, and G. E. Bingham.
26 May 81, 34p CONF-810488-1
Contract W-7405-ENG-48
International symposium on energy and ecological modelling, Louisville, KY, USA, 20 Apr 1981.

Three models have been developed to estimate the effects of air pollutants on vegetation at the photosynthetic process (PHOTO), plant (GROWI), and community (SILVA) levels of resolution. PHOTO simulates the enhancement of photosynthesis at low H sub 2 S levels, depression of photosynthesis at high H sub 2 S levels, and the threshold effects for sulfur pollutants. GROWI simulates the growth and development of a plant during a growing season. GROWI has been used to assess the effects on sugar beets of geothermal energy development in the Imperial Valley, California. SILVA is a community-level model simulating the effects of SO sub 2 on growth, species composition, and succession, for the mixed conifer forest types of the Sierra Nevada, California. (ERA citation 06:024120)

6G. Escape, Rescue, and Survival

AD-A100 769/9 PC **A02**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
United States Coast Guard Emergency Underwater Escape Rebreather Evaluation.
Final rept.,
C. G. Gray, E. O. Thalmann, and R. Syklawer.
Apr 81, 18p Rept no. NEDU-2-81

The United States Coast Guard (USCG) Emergency Underwater Escape Rebreather (UER) was evaluated at the Navy Experimental Diving Unit. Physiologic testing in the dry laboratory, monitoring breath-to-breath O2 and CO2 levels, delineated the factors used in selection of 40% O2 as an appropriate and safe breathing mixture. Tests during exercise provided the maximum usable duration in cold water to be 2 minutes. Pool studies evaluated the suitability for in-water use of the UER to a maximum working depth of 6 FSW. The results demonstrated the UER to be an acceptable shallow depth emergency escape device. The use of a nose clip or face mask is recommended to minimize gas loss and possible aspiration of water through the nose. Minor shortcomings in the breathing characteristics of the device may be improved by changes in the breathing bag configuration. (Author)

PB81-871410 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Personal And General Survival in Nuclear Warfare. January, 1970-July, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jul 81.
Jul 81, 176p

This bibliography covers various factors and systems relating to both military and civilian personal and general survival in nuclear warfare. Vulnerability and security of people, material, and systems are considered as well as their survivability. A wide variety of studies and analyses, many of them based upon computerized simulations, are included. (Contains 132 citations fully indexed and including a title list.)

6H. Food

AD-A100 919/0 PC **A04**/MF **A01**
Army Natick Research and Development Command, MA. Food Engineering Lab.
Energy Rating of Food Service Equipment Used in Army Dining Facilities.
Technical rept.,
K. H. Hu, R. A. Lampi, and M. Meyers. Nov 79, 67p FEL-105, NATICK-TR-80/006

This report provides energy ratings (in terms of Btu consumption) of food service equipment that might be used in Army dining facilities. A Btu Rating List is attached to this report (Appendix) so that energy consumption of equipment can be readily compared. This report also furnishes a simple computation for calculating the costs of energy for operation. It also shows, in detail, how Btu ratings are calculated and their significance. It has been learned from calculations made on the Btu Rating List and from laboratory testing at NARADCOM that steam (whenever it can be used directly for heating) is the least expensive type of energy, gas is second, and electricity is the most expensive. The BTu ratings and costs of energy for operation that are provided in this report, together with other considerations, such as initial and maintenance costs, product acceptance, etc., can contribute to a more rational selection of equipment and systems. (Author)

AD-A101 020/6 PC **A05**/MF **A01**
Army Natick Research and Development Labs., MA.
USAF Food Habits Study. Part III. Weight Gain and Food Preferences of the Overweight.
Technical rept.,
Kerry W. Wyant, and Herbert L. Meiselman. Oct 79, 100p Rept no. NATICK/TR-79/043
See also Part 1, AD-A085 876.

Based upon self-reported descriptions and using the height-weight tables of the Metropolitan Life Insurance Company, a sample of Air Force enlisted personnel, broken down by race and sex, were classified as either overweight (OW), average weight (AW), or underweight (UW), and weights upon entrance into the service were compared with weights after entrance into the service. Further, food preferences were assessed. The majority of the male respondents were OW while the majority of female respondents were AW, and more females than males were concerned about their weight. Approximately 25% of the OW males became OW within the first 2 years of service, and OW respondents with a meal card tended to have gained more weight than OW respondents without a card. Meat items were among the high preference foods of the OW while fruits were among the high preference foods of the AW and UW. Seventeen of the foods for which significant preference differences were obtained were preferred more by the OW than the UW, and 13 of these were meat or entree items. Overweight females as well as OW males exhibited a greater preference than did the UW for meats and entrees. Overweight respondents also indicated a greater preference for low calorie soda. Other preference differences indicated that lighter weight respondents preferred fruits and desserts more than did the OW. Females were the most likely to report using dieting methods to lose weight. (Author)

AD-A101 187/3 PC **A09**/MF **A01**
Army Natick Research and Development Labs., MA.
New Systems of Food Service Management for the Air Force.
Technical rept.,
P. Brandler, T. T. Mattus, and R. J. Byrne. Sep 79, 195p Rept no. NATICK/TR-81/004

This report presents a comprehensive analysis of feasible alternatives to current Air Force food services including appropriated and non-appropriated fund operations. The definition, development and analysis of each alternative is presented with a justification delineating the costs and benefits when compared to the current system. The alternatives range from one organization having complete responsibility for all food service operations on a base to minor changes and improvements in the current system. (Author)

PAT-APPL-6-242 778 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Direct Ohmic Heating Device.
Patent Application,
Ronald A. Segars, Stephen T. Johnson, and Stephen M. Swift. Filed 11 Mar 81, 9p AD-D008 539/9
Availablity: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus is disclosed that will accomplish that rapid thawing and heating of frozen food blocks through direct ohmic heating. Electrodes made from an electrically conducting plastic make direct contact with the food, and ordinary AC power travels through the food. (Author)

PAT-APPL-6-247 713 PC **A03**/MF **A01**
Department of Health and Human Services, Washington, DC.
Laboratory Rat Feeder.
Patent Application,
John Hunzider. Filed 26 Mar 81, 30p PB81-221210
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to a feeding device and feed storage hopper for laboratory rats which device is used for experimental purposes, and more particularly to such device which restricts bodily entry of the rats into the feeder device.

PB81-218760 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Food Safety Policy: The Delaney Amendment.
Staff rept.,
Sara D. Short. Apr 81, 27p AGESS-810423

Increasing use of chemicals in all stages of food production has generated concern about possible harmful health effects of these chemicals. Federal regulation of foods has attempted to control exposure to some chemicals. Between 1950 and 1953, New York Congressman James Delaney conducted a series of hearings on the nature and use of chemicals added to the food supply. One resulting piece of the legislation was the Food Additives Amendment of 1958, of which the Delaney clause is a part. This clause prohibits use of any chemical found to induce cancer when ingested by animals or humans. This paper discusses current and previous issues concerning this controversial clause.

PB81-224362 PC **A09**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Protein Recovery From Beef Packing Effluent.
Final rept. 1977-81,
John C. Ward, Walter Adams, and H. Chr. Isaksen. Jun 81, 178p EPA/600/2-81/112
Grant EPA-S-804505
Prepared in cooperation with Sterling Colorado Beef Company, Sterling, CO. and Alwatech, Oslo, Norway.

The wastewater from a beef packing plant contained 4,600 mg/1 COD and 2,500 mg/1 of suspended solids. A physiochemical wastewater treatment process that recovers protein removed 80%

of the oxygen demand and suspended solids, and 94% of the fat, oil, and grease. Total cost was $3 per 1,000 gallons (44% capital costs). About 2 pounds of protein were recovered per head. A price of 42 cents per pound of protein would pay all costs. The discharge of BOD was reduced to less than 3 pounds per head. For every pound of BOD entering the wastewater treatment plant, 0.77 pounds of product was recovered with a composition of 38% protein, 11% grease and oil, 27% inorganic solids, and 24% other solids (dry weight basis). This wastewater treatment process can be used as a pretreatment process for beef packing effluent prior to discharge to a conventional sewage treatment plant. A literature survey covering 7 different beef packing wastewater treatment processes was developed from 87 papers and reports. The cost figures given above were observed in a full scale plant and should not change significantly with different size wastewater treatment plants.

PB81-867855 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fish Protein Concentrates: Processing Methods and Nutritional Considerations. January, 1974-May, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-May 81.
May 81, 49p

This bibliography contains citations concerning many aspects involved in the processing of fish protein concentrates. Its use as a protein supplement in developing and under-developed countries is included. Also covered are the nutritional value and biochemical analysis of these products. The commercial implicaitons are noted. (Contains 46 citations fully indexed and includes a title list.)

PB81-869349 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Retortable Food Pouches. January, 1972-June, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jun 81.
Jun 81, 66p
Supersedes PB80-806979.

This report deals with various aspects of retortable food pouches, including their production, technology, testing, sterilization, storage stability and numerous applications. (This updated bibliography contains 66 citations, 21 of which are new entries to the previous edition.)

PB81-871386 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dairy Flavors: Cheese (Kachkaval). January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 60p

This bibliography contains citations concerning the properties and factors affecting kachkaval cheese. The manufacturing and ripening processes, starter selections, and the milks used are all included. (Contains 53 citations fully indexed and includes a title list.)

PB81-871907 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Development, Design and Use of the Retort Pouch. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 190p

This retrospective bibliography contains citations concerning the development, design and use of the retort pouch. Materials to produce the pouches are discussed and the machinery to make, fill and seal the pouches is cited. The advantages, applications, microbial hazards and factors affecting quality changes of the products are noted. The use by the food industry is detailed. Government regulations are considered. (Contains 124 citations fully indexed and including a title list.)

PB81-871964 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Texturized Vegetable Protein Used in Foods. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 84p
Supersedes PB80-805120.

The production and use of texturized vegetable proteins used as meat extenders and substitutes, are covered in this eight-year survey from the world literature. Textural, rheological, morphological, and ultrastructural properties, and measurement methods, are delineated. Extrusion cooking and thermal lamination methods for producing texturized vegetable protein are described. Other subjects covered are the nutritional value, economics of use, consumer response, regulations, flavoring, and applications of texturized vegetable proteins. (This updated bibliography contains 88 citations, 15 of which are new entries to the previous edition.)

PB81-871972 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mycotoxin Carcinogenicity in Food. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 61p
Supersedes PB80-803422.

The reports deal with the occurance and bioproduction of mycotoxins and aflatoxins in foods, tolerance levels, newly discovered mycotoxins and aflatoxins, toxicity, modes of action, metabolism, and public health aspects. Experiments appearing to prove a link to hepatic cell cancer in rats, and the implied link to such cancer in humans, are delineated. The mutagenic and carcinogenic effects in animals and in humans are discussed, including DNA alteration, chromosomal aberrations, cell transformations, cytological investigations, and in-vitro and in-vivo reactions with nucleac acids. Much of the source of mycotoxins in food destined for human consumption can be traced to two fungi: aspergillus and penicillum. These appear in foods such as rice grains, cereal grains, rice and wheat flour, soybeans, red beans, and other legumes, some fermented foods, some pickled foods, dried fish, and edible seaweeds. (This updated bibliography contains 52 citations, 11 of which are new entries to the previous edition.)

PB81-872053 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ultraviolet Properties of Foods. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 143p
Supersedes PB80-804883.

Ultraviolet light absorption properties of foods and beverages, and measurement equipment and techniques, are included in the cited reports. Some of the determinations, made possible by ultraviolet absorption measurements, are animal fat and oil levels, protein content of meat and dairy products, saccharin levels in foods, oil-contamination levels in marine animals, vitamin E level, and the caffeine content of coffee. (This updated bibliography contains 133 citations, 25 of which are new entries to the previous edition.)

PB81-872061 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ultraviolet Radiation of Foods. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 120p
Supersedes PB80-804891.

The cited reports cover the use of ultraviolet radiation in the food industry to disinfect, heat treat, sterilize, and kill spores. The effect of the food container, and possible degradation of food additives, are included. The relationship between the resultant vitamin D level, and ultraviolet irradiation, is discussed. (This updated bibliography contains 113 citations, 16 of which are new entries to the previous edition.)

PB81-872079 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cyclamates in Foods. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 106p
Supersedes PB80-805096.

Citations are included on a much-used artificial sweetner. Safety aspects, such as possible toxicity, carcinogenicity, mutagenicity, and teratology in animals and in humans, are discussed. Manufacturing, uses, and effectiveness of cyclamates, in addition to laws and regulations governing its use, are covered. Questions of marketing and consumer use, and acceptance, are also addressed. (This updated bibliography contains 105 citations, 9 of which are new entries to the previous edition.)

PB81-872087 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chlorophyll Studies Related to Food Science. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 255p
Supersedes PB80-804933.

The presence of chlorophyll in foods is discussed. Included in the bibliography are chlorophyll concentration as a function of growing methods and variations, and techniques of measurement such as spectrophotometry and thin-film chromatography. Also included are methods of extraction, the effects of heat, relative humidity, light, refrigeration and gamma radiation, and techniques for greening and degreening of food products. (This updated bibliography contains 241 citations, 21 of which are new entries to the previous edition.)

PB81-872301 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Manufacture of Chewing Gum. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 40p

This bibliography contains citations concerning manufacturing processes and practical aspects involved in the production of chewing gum. Chewing gum bases, other ingredients (such as starch, sugars), recipes, and equipment used in production are discussed. Patents are mentioned. (Contains 52 citations fully indexed and includes a title list.)

PB81-872319 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flavoring Enhancers for Chewing Gum. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 36p

This bibliography contains citations concerning chemical agents which enhance and prolong the release of chewing gum flavor. Specific chemical agents are discussed in detail. Patents are included. (Contains 44 citations fully indexed and includes a title list.)

PB81-872384 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Packaging of Fruit Juices and Fruit Drinks. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 86p

This bibliography contains citations concerning the packaging of fruit juices and fruit drinks. Aseptic packaging utilizing hydrogen peroxide or irradiation is described. Many types of packaging materials, designs and equipment are included. (Contains 54 citations fully indexed and including a title list.)

PB81-872475 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Catering Services: Nutritional Value of the Food. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 47p

This bibliography contains citations concerning the nutritional value of catering service foods, including protein, lipid, and carbohydrate content. The effects of food preparation, storage, and distribution on the nutritional value are covered. Frozen and refrigerated meals and the effects of microwave heating on nutritional content are mentioned. The effects of changing eating habits, and increased consumption of junk foods, are included. (Contains 42 citations fully indexed and includes a title list.)

PB81-872798 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microwave Home Cooking. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 184p
Supersedes PB80-806995.Sponsored in Part by National Technical Information Service, Springfield, VA.

Many subjects relating to microwave home cooking are covered in these citations from the world food literature. Home microwave cooking, oven design and safety, and leakage of microwaves, are discussed. The relative effects on food flavor, nutrient content, and residual spore and bacterium count when processed by microwave versus conventional cooking means, are delineated. A number of cookbooks specifically designed for use with a home microwave oven, are listed. (This updated bibliography contains 203 citations, 39 of which are new entries to the previous edition.)

PB81-872806 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nisin in Foods. January, 1972-July, 1981 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 94p
Supersedes PB80-804859.

Nisin, an antimicrobial preservative much used outside the United States, is discussed in the cited reports. In addition to its action as a preservative or stabilizer, in foods, wines, and dairy products, and a degassing agent in processed cheeses, nisin prevents germination of heat-resistant spores in low-acid products, and of aciduric organisms in acid-pack canning. Measurement methods for the determination of nisin content are included in these citations. (This updated bibliography contains 96 citations, 7 of which are new entries to the previous edition.)

6J. Industrial (Occupational) Medicine

PB81-222077 PC **A08**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Self-Evaluation Instrument--Nitrogen Fertilizer Industry.
Frank W. Godbey, Loren L. Hatch, James D. Massie, Arthur N. Gentry, and George Mueller.
Sep 80, 167p DHHS/PUB/NIOSH-80-148

A questionnaire is developed to allow self evaluation of exposure hazards by workers in the nitrogen fertilizer industry (SIC-2873). The questionnaire is directed toward operations, work practices, proper procedures, and regulations within the industry, and provides guidelines for the implementation of hygienic measures. Each section of the questionnaire is preceded by a brief explanation of the occupational safety and health hazards that may exist in the particular work area covered by that section. The authors recommend that companion documents, self-evaluation of Occpational Safety and Health Programs, which provide basic information applicable to all industries, be used in conjunction with the questionnaire to aid in the implementation of a comprehensive occupational safety and health program.

PB81-222481 PC **A10**/MF **A01**
SRI International, Menlo Park, CA.
Industrial Hygiene Surveys of Occupational Exposures to Mineral Wool.
Technical rept.,
Douglas P. Fowler. Sep 80, 203p DHHS/PUB/NIOSH-80-135
Contract PHS-NIOSH-210-76-0120

Exposures to mineral wool fibers, total suspended particulate material, respirable particulate material, and trace metals were evaluated among users and producers of mineral wool. Study methods included breathing zone air sampling with gravimetric, optical and scanning electron microscopy, and atomic absorption analyses to determine airborne concentrations. Samples of bulk materials were also analyzed. The production workers had relatively low exposures to all forms of airborne particulate material. The user workers had higher, but more variable exposures. Exposure to excessive noise levels were consistently found in the cupola areas of the production facilities. Heat stress was a potential hazard for the installers of blown mineral wool insulation. The author recommends that exposures to blowing wool installers and cupola operators be further evaluated, personal respiratory protection be provided for sprayed fireproofing workers, engineering measures be developed to improve the working conditions of the blowing wool insulation workers, and older material samples be analyzed to identify potential past exposure to small diameter fibers.

PB81-222531 PC **A17**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
A Symposium on the Diagnosis and Amelioration of Mass Psychongenic Illness in Industry.
Contract rept.,
Michael J. Colligan. 1979, 387p NIOSH-210-79-0033

Proceedings from a symposium on the diagnosis and amelioration of industry related mass psychogenic illness (MPI) is presented. Outbreaks of unusual behaviors, sickness and hysteria in manufacturing and assembly facilities and workplaces in the United States, and other countries including England and Singapore are reviewed. Outbreaks of MPI investigated by NIOSH also are included. Social comparisons, complexities, cautions and concepts in research on MPI are discussed. Stress, illness related behaviors, somatization, triggering events, theoretic and psychoanalytic approaches to the study of MPI are described with reference to concepts of convergence, contagion, emergent norms, core variable, sex difference, and coping with stress. Factors that affected symptoms including hysterical contagion, quality of the working environment, mechanization, automation, shift work, extra-large enterprises, anonymity of the workers. Workers and management relations are discussed. The effect of MPI on rapid industrialization in developing countries in described and MPI and chemically induced hypersusceptibility are compared.

PB81-223646 PC **A09**/MF **A01**
Rexnord, Inc., Milwaukee, WI.
Recirculation of Industrial Exhaust Air Pilot Study (Field Evaluation of Air Cleaners and Monitors).
Contract rept.,
Mark L. Holcomb, and Robert C. Scholz. May 80, 200p NIOSH-210-78-0011
Contract PHS-NIOSH-210-78-0011

Performance characteristics, maintenance requirements and reliability of pilot scale air cleaners and monitors were evaluated. A set of evaluation criteria was developed for recirculation components. System components which included an aspirated cartridge filter, particulate air monitors, ozone monitors and a safety monitoring filter were tested on industrial welding exhausts to evaluate performance, potential failure, and requirements of proper maintenance. The authors conclude that the criteria can be applied to any recirculation system. They recommend that the technical and economic feasibility of recirculation be assessed by pilot testing procedures, and a mobile recirculation system incorporating pilot scale devices to conduct pilot scale testing be used.

PB81-223935 PC **A05**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Effects Evaluation Data File.
Technical rept.,
Virginia Behrens, Edward Dacey, Roop Jain, Foster Burns, and Pradeep Trasi. Oct 80, 87p
Prepared in cooperation with Cincinnati Univ., OH.

The design of the Health Effects Evaluation Data (HEED) File and the methods used to abstract, code, and computerize Health Hazard Evaluation (HHE) and Technical Assistance (TA) data are described. The following data item categories were included in the final data base design: general report information; hazards; occupations; environmental samples; morbidity and mortality; and laboratory and medical tests. HHE and TA reports are prepared for entry into the data base by personnel trained in chemistry. Computerization of the basic file for the data base is managed by a computer programmer. The data from HHE/TA reports is coded numerically in the HEED File so that analyses such as hierarchical aggregations, frequency counts, cross tabulations, and selection of quantitative levels of categories can be performed. Examples of computer printouts from HHE and TA report are provided along with a listing of potential HEED File users.

PB81-225351 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Training and Manpower Development.
Occupational Safety and Health Hazards in Rehabilitation Facilities.
Sep 80, 41p DHEW/PUB/NIOSH-80/147

Occupational safety and health hazards in rehabilitation facilities are discussed. Hazards associated with fire, machine guarding, electrical equipment, housekeeping, material handling, and walkways and exists, and exposures to chemical and physical agents are reviewed. Hazard control methods involving engineering and administrative controls, and personal protection measures are outlined. Hazards due to poorly trained staff and outmoded equipment are considered. Routes of exposure for hazardous substances are listed along with work operations that commonly involve chemical exposure. The effects of the physical and mental condition of the exposed individual on hazard responses are discussed. Safety and health assistance services provided by federal and state governments and by private consulting firms are discussed.

SAND-81-1131C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
New Approach for Assuring Acceptable Levels of Protection from Occupational Safety and Health Hazards.
C. A. Trauth, Jr., and J. B. Sorenson. 1981, 31p CONF-810555-1
Contract AC04-76DP00789
Annual SW labor studies conference, Albuquerque, NM, USA, 1 May 1981.

This paper briefly describes the approach to environmental, safety and health program management and its relevance to the conflict over approaches to the national management of occupational safety and health that exists today. (ERA citation 06:023634)

6K. Life Support

AD-A100 823/4 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Digital Control System for An On-Borad Oxygen Generator.
Master's thesis,
Thomas C. Horch. Dec 80, 88p Rept no. AFIT/GEO/EE/80D-2

A prototype on-board oxygen generation system (OBOGS) is being tested by the USAF School of Aerospace Medicine (SAM). The OBOGS is a candidate to replace present liquid oxygen systems for aircrew consumption on manned aircraft. The OBOGS passes outside air through a molecular sieve to produce an oxygen enriched breathing product. Oxygen concentration of the OBOGS's output is controlled by a purge orifice valve. The SAM envisions using a digital system to control the OBOGS. A digital contro system for the OBOGS was developed and consists of a stepper motor, microprocessor, system sensor, support circuitry, and software. The control system software is a collection of instructions which allow the MPU to read data from sensors, to interpret that data, and to issue system hardware control signals. System software was fairly complex as methods were employed to compensate for the OBOGS's lengthy response time. This was accomplished by using a segmented table. If motor drive is anticipated to be time-consuming, a software routine is used to preposition the motor to a predetermined location within the segmented table. This position is updated when more accurate information is available. A prototype system was constructed and tested in the laboratory. The control system successfully controlled the stepper motor. (Author)

AD-A101 059/4 PC **A08**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Automated Calculation of Protection Factors for the Sodium Chloride Respirator Quantitative Fit Test Instrument.
Final rept. 1 Jan-15 Aug 80,
Edward S. Kolesar, Jr. Dec 80, 160p Rept no. SAM-TR-80-50

An automated procedure for calculating a respirator protection factor is presented in this report. This procedure not only reduces the sodium chloride leak test data, but also calculates a protection factor using a voltage-to-frequency converter circuit to do time-averaged integration and a least-squares curve fit computer program. (Author)

6L. Medical and Hospital Equipment

PAT-APPL-6-239 015 PC **A02**/MF **A01**
Department of Health and Human Services, Washington, DC.
Anastigmatic High Magnification, Wide-Angle Binocular Indirect Attachment for Laser Photocoagulator.
Patent Application,
Oleg Pomerantzeff. Filed 27 Feb 81, 15p PB81-222549
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to photocoagulation of the human eye and, more particularly, to improved methods and apparatus for laser photocoagulation.

PAT-APPL-6-239 448 PC **A02**/MF **A01**
Department of Health and Human Services, Washington, DC.
Macula-Disc Camera with Improved Resolution.
Patent Application,
Oleg Pomerantzeff. Filed 2 Mar 81, 13p PB81-222556
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to ophthalmoscopic cameras in general and, more particularly, to a macula-disc camera having improved resolution. In order to increase the resolution of retinal detail in fundus cameras it is necessary to increase the magnification and thereby clarify microscopic details. In the prior art, greater magnification has been realized only by increasing the magnification of the recording camera, thereby magnifying one part of the intermediate aerial image without changing the objective (i.e. ophthalmoscopic lens) of the fundus camera.

PAT-APPL-6-262 153 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Helmet Mounted Eye Tracker Using a Position Sensing Detector.
Patent Application,
Denis R. Breglia. Filed 11 May 81, 12p AD-D008 545/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A helmet mounted eye tracker is disclosed for monitoring the position of the cornea of human eye which includes an infrared light source for projecting a pulsed infrared light beam along a first optical path, a mirror for redirecting the pulsed infrared light beam along a second optical path, and a beam splitter for redirecting the pulsed infrared light beam onto the cornea of the eye such that within the eye a virtual image is formed which changes position with movement of the cornea of the eye. The virtual image formed within the eye is then redirected along the second optical path by the beam splitter to the mirror which, in turn, redirects the virtual image to a collecting lens positioned along the first optical path. The collecting lens will then focus the virtual image upon the active area of an infrared light detector which will provide at its output square wave signals indicative of the X and Y coordinate positions of the cornea of the eye within the active area of the infrared light detector. (Author)

PATENT-4 244 787 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Apparatus and Method for Determining Serum Concentrates of Metabolites by Monitoring Dialysate Fluid.
Patent,
Elias Klein, and Ronald L. Wathen. Filed 11 Jun 79, patented 13 Jan 81, 8p PB81-218943, PAT-APPL-6-047 786
Supersedes PB81-152738.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus and method are disclosed for monitoring, analyzing and quantitating in real time the concentrations of metabolites in serum by analyzing the dialysate solutions which are being equilibrated with the blood via a hemodialyzer. Thus, access to certain metabolically important species is provided without the necessity of blood sampling. The apparatus includes at least one ion-selective electrode coupled with the dialysate effluent stream, and the electrode EMF is converted to dialysate concentrations based on precalibration. The dialysate concentrations, in turn, are related to serum levels by factors governing mass transfer through the dialyzer.

PB81-216715 Not available NTIS
National Bureau of Standards, Washington, DC.
Adhesive Bonding of Various Materials to Hard Tooth Tissues: XXII. Isotonic Monomer Formulations.
Final rept.,
R. L. Bowen. May 81, 7p
Sponsored in part by National Inst. of Dental Research, Bethesda, MD. See also report dated May 80, PB80-194418.
Pub. in Jnl. of Dental Research 60, n5 p901-907 May 81.

With regard to adhesion to dentin by chemical mechanisms, the vitality of odontoblasts and contiguous pulpal cells might require that materials influencing the dentinal tubules be maintained within certain limits of osmotic pressure. Resins for use in adhesive formulations can be made isotonic with vital tissues by adjusting the proportions of hydrophilic monomers and the water contents of the formulations.

PB81-221798 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper No. 2: Case Studies of Medical Technologies. Case Study No. 6: The Cost Effectiveness of Bone Marrow Transplant Therapy and Its Policy Implications,
S. O. Schweitzer, and C. C. Scalzi. May 81, 27p OTA-BP-H-9(6)
Library of Congress catalog card no. 80-600161.
See also PB80-216864.

The diffusion of biomedical technology in the United States has had a striking impact on health care personnel, institutions, and costs. The rate at which biomedical innovations are diffused within the health care system, although an important characteristic of that system, is also one about which relatively little is known. The diffusion of some innovations (e.g., certain anticancer drugs) is allegedly too slow, while the diffusion of others (e.g., coronary bypass surgery and total body scanners) is allegedly too rapid. The authors have little knowledge about determining how and why technological innovations actually diffuse and little experience in specifying socially optimal rates of diffusion for various types of innovations. Focusing on one new technology--bone marrow transplantation (BMT)--this study presents both a critical analysis of the technology itself and policy options that would strengthen control over the rate of technological diffusion.

PB81-221806 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper No. 2: Case Studies of Medical Technologies. Case Study No. 7: Allocating Costs and Benefits in Disease Prevention Programs: An Application to Cervical Cancer Screening,
Bryan R. Luce. Jun 81, 43p OTA-BP-H-9(7)
Library of Congress catalog card no. 80-600161.
See also PB80-216864.

This study is an attempt to advance the state of the art of cost-effectiveness analysis (CEA) as the technique pertains to disease prevention and health promotion programs. Cervical cancer screening is used as the subject of analysis to demonstrate the application of CEA to a disease prevention program. First, the disease process is modeled using a Markov chain technique to 'age' a simulated population of 30- to 39-year-old women for 10 years, using disease transition probabilities reported in the literature. Then, the cost effectiveness of screening at different intervals, ranging from no screening to annual screening for the 10-year period, is calculated. The effects of the following are evaluated: (1) different migration patterns, (2) different risk groups, (3) different modes of administering Pap tests, and (4) joint production considerations. The sensitivity of the results both to various discount rates and to a range of Pap test error rates are also tested.

PB81-221814 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper No. 2: Case Studies of Medical Technologies. Case Study No. 8: The Cost Effectiveness of Upper Gastrointestinal Endoscopy,
Jonathan A. Showstack, and Steven A. Schroeder. May 81, 33p OTA-BP-H-9(8)
Library of Congress catalog card no. 80-600161.
See also PB80-216864.

Upper gastrointestinal endoscopy is only one of many relatively new diagnostic and therapeutic technologies that are in widespread use in the medical care system. Examples of others are coronary angiograms, renal hemodialysis, and fetal monitoring. Few new technologies are evaluated thoroughly before they become part of 'standard

practice.' Evaluating their worth and attempting to make their use as efficacious as possible, therefore, presents many formidable problems. This report presents analysis of the cost and efficacy of the current use of upper gastrointestinal endoscopy. However, the analyses and conclusions reached have parallels in many other medical technologies already in current use in a wide variety of medical specialties in many different settings.

6M. Microbiology:

AD-A100 929/9 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Identification, Distribution, and Toxigenicity of Obligate Anaerobes in Polluted WAters.
Medical research progress rept.,
O. P. Daily, S. W. Joseph, J. D. Gillmore,, R. R. Colwell, and R. J. Seidler. 13 Jun 80, 6p Rept no. NMRI-81-23
Pub. in Applied and Environmental Microbiology, v41 n4 p1074-1077 Apr 81.

No abstract available.

ANL/LRP-11 PC **A03**/MF **A01**
Argonne National Lab., IL.
Staunton 1 Reclamation Demonstration Project. Soil Microbial Structure and Function: Final Report.
R. M. Miller, and S. W. May. Feb 81, 30p
Contract W-31-109-ENG-38

At the Staunton 1 reclamation demonstration project in southwestern Illinois, comparisons were made of microbial decomposition rates, respiration, and microbial numbers in several coal refuse reclamation treatments. After 1.5 years, none of the reclamation treatment plots equalled the old-field control plot in decomposition rates or microbial resiration. Microbial numbers in the reclamation plots, however, approached those of the old field, although species diversity in the old field was much higher than that in the reclamation plots. (ERA citation 06:023052)

DOE/ER/10499-1 PC **A03**/MF **A01**
Georgia Univ., Athens.
Microbiology and Physiology of Anaerobic Fermentations of Cellulose. Progress Report, September 1, 1979-May 15, 1980.
H. D. Peck, Jr., and L. G. Ljungdahl. 1980, 33p
Contract AS09-79ER10499

Reseach progress is reported for the period September, 1979 to May, 1980. Studies on the mesophilic and thermophilic microorganisms fermenting cellulose to various products (ethanol, acetate, CO sub 2 , H sub 2 , and methane) are summarized. (ERA citation 06:024307)

PAT-APPL-6-141 508 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Irradiation of Microorganism Such as Bacteria and Viruses in the Presence of Chemical Enhancing Agent.
Patent Application,
T. G. Metcalfe. Filed 18 Apr 80, 10p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a method for disinfecting waste material, such as sewage, containing harmful microorganisms by means of high energy ionizing radiation. This method includes the addition of a chemical enhancing agent such as aluminum chlorde or ferric chloride which would increase the sensitivity of the microorganisms to irradiation. Consequently lower radiation doses would be needed for disinfection. (ERA citation 06:022696)

6N. Personnel Selection and Maintenance (Medical)

AD-A101 018/0 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
The Effect of Long-Term Therapeutics, Prophylaxis and Screening Techniques on Aircrew Medical Standards.
Conference proceedings,
C. E. Simpson. Mar 81, 149p Rept no. AGARD-CP-310
Presented at the Aerospace Medical Panel Specialists' Meeting, Toronto (Canada), 15-19 Sep 80.

The introduction of advanced aircraft has placed a much increased stress on aircrew who are subjected to the high physical stress loads of sustained high 'g' manoeuvres, vibration, high noise levels and heat stress. Crews are required to produce a constant high degree of concentration with little or no margin for error. Is an increased degree of aircrew fitness necessary. Is there a need for special selection of the crews to fly these aircraft. The diagnosis of certain diseases has, to date, resulted in the concerned aircrew being declared permanently unfit to fly. Modern methods of treatment, however, have now made it possible to consider the return of these aircrew to flying duties. Under what conditions may aircrew with diseases which require long-term therapy continue to fly and what limitations must be applied in such cases. The papers presented at the Aerospace Medical Panel Specialists' Meeting in Toronto, Canada, 15-19 September 1980 address these questions. (Author)

AD-A101 070/1 PC **A09**/MF **A01**
Army Natick Research and Development Labs., MA. Clothing, Equipment and Materials Engineering Lab.
Comparative Anthropometry of the Hand.
Technical rept.,
Robert M. White. Dec 80, 185p NATICK/CEMEL-229, NATICK-TR-81/010

Comparative anthropometric data on the human hand are presented and discussed in detail in this technical report. Since reliable and definitive data on the hands of the U.S. civilian population are lacking, anthropometric data on the hands of the U.S. military population of men and women may be utilized in analyses of handwear sizing. Data are presented for ten hand measurements: Hand Length, Palm Length, Thumb Crotch Length, Hand Breadth, Hand Breadth at Thumb, Hand Circumference, Hand Circumference at Thumb, Fist Circumference, Wrist Circumference, and Hand Thickness. These hand measurements are defined and illustrated. Detailed anthropometric data on the hands of U.S. Army men and women are presented in the form of bivariate tables which depict the distribution of various categories of hand sizes, and show the interrelationships among hand dimensions. Selected anthropometric data on the hands also are presented for a variety of foreign military populations in order to illustrate the range of variation in hand size to be found in different parts of the world. In the final section, hands and handwear are examined in terms of the sizing of handwear, and the development of tariffs for handwear is explained with illustrative examples. An extensive bibliography concludes the report. (Author)

PB81-220006 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Visual Acuity Testing of Radiographic Inspectors in Nondestructive Inspection.
Final rept.,
Gary T. Yonemura. Jun 81, 32p NBS-TN-1143

Visual acuity tests for radiographic inspectors should be correlated with the type of tasks encountered in real world radiography. The testing procedures should be capable of assessing differences in day to day performance of a given inspector as well as the performance of one inspector relative to other inspectors. Single line targets with specific parametric values for contrast, width, and blur are recommended to provide a means for testing a radiographic inspector for visual acuity. These targets may be used for periodic tests by the employing organization or for more frequent self testing by the inspector. Statistics from the National Health Survey, procedures recommended by the NAS-NRC Committee on Vision and real world radiographs have been utilized in arriving at recommended test configurations.

6O. Pharmacology

AD-A100 586/7 PC **A03**/MF **A01**
Houston Univ., TX. Dept. of Biology.
Site of Action of Antidiuretic Hormone on Mammalian Nephrons.
Final rept.,
David mailman. 1981, 28p
Contract N00014-75-C-0166

There are two basic mechanisms by which salt, water and small organic solutes cross epithelial tissues, such as the gut and kidney, from the lumen into the blood. One mechanism is by transcellular transport across the luminal mucosal or apical cell membrane and then through the basolateral or serosal cell membrane. Solutes are transported by membrane carrier molecule pumps which transport the solutes by facilitated or active transport. A second mechanism by which many of the same solutes cross the membrane is through passive, paracellular movement through the tight junctions and the lateral intercellular spaces between the epithelial cells. Peptide hormones can directly affect transcellular movement by binding to the cell membranes at receptor sites and modulating intracellular events which increase or decrease pump activity. These same hormones could have cardiovascular effects which modify transcellular pumping by altering the delivery of O2 to the cells for support of transport energy requirements. Passive, paracellular transport can be altered by hormones acting through cardiovascular effects by changing blood flow and thus the degree of 'washout' of absorbed molecules from the epithelium and by changing capillary and tissue pressures resulting in a change in the magnitude of ultrafiltration across the capillaries and epithelium. The research supported by this grant investigated several aspects of the above mechanisms.

AD-A100 731/9 PC **A02**/MF **A01**
Hebrew Univ., Rehovoth (Israel). Faculty of Agriculture.
Target Oriented Drugs against Leishmania.
Annual summary rept. no. 2, 1 May 80-30 Apr 81,
Uri Zehavi, and Joseph El-On. 31 Jan 81, 20p
Grant DAMD17-80-G-9474

Excreted Factor (EF) is a carbohydrate-rich material released by different strains of Leishmania during growth. It has antigenic properties similar to those of the intact parasite and plays a role in the infective process. Isolation and purification of EF is necessary for study of its biological function, its use for diagnostic purposes, its use in immunization experiments, the study of its biosynthesis, and the preparation of inhibitors of particular biosynthetic steps. Purification of EF by affinity chromatography was markedly improved by introducing Ricinus lectin (specific for galactose) column. This enabled us to obtain more reliable amino acid and sugar analysis and will be instrumental in more advanced physical, chemical, and immunological studies. We have developed a radioimmunoassay for leishmaniasis utilizing purified EF. The assay can distinguish between Leishmania strains and once further developed, should prove most valuable for the diagnosis of the disease. EF plays a role in the infective process of Leishmania. We have now shown that surface carbohydrate, related to EF, plays a role in the initial attachment of Leishmania promastigots to macrophages - a stage that is a prelude to their engulfment by the macrophages followed by multiplication in their cells. (Author)

PB81-204000
(Order as PB81-203978, PC **A05**/MF **A01**)
Beijing Medical Coll. (China). Dept. of Pharmacology.

Preliminary Study on Antiradiation Effect of Lingzhi.
Zhibin Lin, Zhiling Zhang, Huiren Liu, Yucheng Wu, and Yuan Ruan. 24 Jan 79, 2p
Included in Kexue Tongbao, v25 n2 p178-179 Feb 80.

As radiation injury is both disastrous to human health and on the increase today, the quest for antiradiative drugs is of ever greater significance. Previous reports have shown that, preparations of Lingzhi (Ganoderma lucidum) are effective for the treatment of leukopenia induced by radiation, by chemical products, or by some other factors, which implies that such a drug might be helpful to the prevention of radiation injury. Thus the authors made a study on the antiradiation effect of Lingzhi solution karst; for the method of extraction.

PB81-213605 PC **A03**/MF **A01**
Washington Univ., Seattle. School of Medicine.
Pharmacokinetic Studies in Chronic Renal Disease and Hemodialysis.
Final rept. 19 Dec 78-18 Dec 80,
R. E. Cutler, A. D. Blair, E. D. Burgess, and K. H. Krichman. 18 Apr 81, 29p AK-5-2-2219-F
Contract N01-AM-2-2219
Prepared in cooperation with Harborview Medical Center, Seattle, WA.

Modifications of reported high performance liquid chromatographic assays for cimetidine and disopyramide have been developed. Renal clearance of creatinine and inulin were measured in 6 healthy subjects before and after a single intravenous bolus of cimetidine (5 mg/kg). Renal clearance of inulin was unchanged but renal clearance of creatinine decreased 20% following cimetidine. This is the first cationic drug to show substantial inhibition of tubular secretion of creatinine in humans. Disopyramide pharmacokinetics were studied in 5 normal and 5 end-stage renal failure subjects treated with intermittent hemodialysis following a single oral dose of 200 mg. There were no significant differences in the following parameters: plasma half-life and elimination rate constant. The relative steady state volume of distribution was significantly decreased in the end-stage renal disease (ESRD) subjects (1.04 plus or minus 0.35, normals; 0.60 plus or minus 0.18 L/kg ESRD, $p = 0.037$). Plasma clearance of disopyramide was significantly reduced in the hemodialysis subjects (66.4 plus or minus 25.3 vs. 30.0 plus or minus 6.6 ml/min/sq.m, $p = 0.026$). There was an increase in the protein binding of disopyramide with decreasing plasma concentration. The normal dose of 150-200 mg every 6 hours needs to be reduced in ESRD patients to 100 mg every 12 hours.

PB81-223232 PC **A10**/MF **A01**
Performance Development Inst., Washington, DC.
The Evaluability Assessment of the Developing Experiment in Post-Marketing Surveillance of Prescription Drugs,
Sumner Claren, Paul Nalley, Gail Gregory, Warren Frederick, and Renee Hausmann. Mar 81, 214p NBS-GCR-ETIP-81-96
Contract NBS-78-3603

The report describes the context within which a regulatory administrative experiment is being developed by the Experimental Technology Incentives Program (ETIP) and the Food and Drug Administration (FDA). The purpose of the experiment is to determine the impact on drug development approval of new methods of gathering and analyzing data after a drug is marketed. The report assesses the evaluability of the experiment, raising measurement considerations and proposing means for evaluation.

PB81-223497 PC **A04**/MF **A01**
Food and Drug Administration, Silver Spring, MD. Bureau of Medical Devices.
Cosmetic-Related Injuries: Study of NEISS Data: 1 Jan 79 to 31 Dec 31.
Final rept.,
Charles L. Selander. 31 Dec 79, 75p FDA/BMD-81/84
See also PB-290 973.

The study is based on 739 cosmetic-related injury cases reported to the National Electronic Injury Surveillance System (NEISS) between January 1, 1979, and December 31, 1979. Considering this number, NEISS estimates that 30,965 cosmetic-related injuries (a low estimate of 22,468 to a high estimate of 39,462 with a 95 percent certainty) were treated in hospital emergency rooms throughout the United States and its territories.

6P. Physiology

AD-A100 646/9 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Aircrew Inflight Physiological Data Acquisition System.
Master's thesis,
Kenneth L. Moore. Jun 80, 126p Rept no. AFIT/GE/EE/80-6

A design is presented for a self-contained, man-mounted data acquisition system to sample and store 12 environmental and physiological parameters. The design consists of one-megabyte of nonvolatile magnetic bubble memory storage, 16 analog input channels, and four digital input channels, and is controlled by a 6502 microcomputer. Operational software was designed and simulation conducted on a Rockwell System-65 minicomputer augmented with two-megabits of magnetic bubble memory. Two types of data storage methods are examined - continuous (or pulse code modulation), and three variations of delta pulse code modulation for reduction of data storage. Nonuniform sampling rates (or sampling jitter) caused by simultaneous sampling requests were investigated, and ways to reduce or eliminate the occurrence of jitter are also presented. (Author)

AD-A100 717/8 PC **A02**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Microbiology.
Effect of Agents That Produce Membrane Disorder on Lysis of Erythrocytes by Complement (Complement Channels/Membrane Channels/Complement Cytotoxicity),
Moon L. Shin, Gertrud Hansch, and Manfred M. Mayer. 14 Jan 81, 4p
Contract N00014-75-C-0142
Pub. in Proceedings of the National Academy of Sciences, v78 n4 p2522-2525 Apr 81.

No abstract available.

AD-A100 789/7 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Feedback Control for Functional Electrical Stimulation of Paralyzed Muscle.
Master's thesis,
Cory D. Carroll. Dec 80, 104p Rept no. AFIT/GE/EE/80D-11

An external harness containing six transducers was developed to provide position information from a cat's rear limbs. The front limbs rest in a sling apparatus while the rear legs are allowed to move in a straight line gait on a motorized treadmill. The aluminum members of the leg harness are noninvasively attached to the skeletal framework of the rear legs. The harness allows a relatively nonrestrictive forward and backward motion while limiting lateral movement of the leg. With the cat in the full harness system, the need for posture control during locomotion is eliminated because of the support system of the harness. During locomotion in the harness, electromyographic (EMG) activity of the essential hindlimb muscles were recorded with the corresponding position information from the harness. This data along with anatomical models of the leg allowed isolation of six essential muscles: iliopsoas, semimembranosus, vastus lateralis, biceps femoris, tibialis anterior, and gastrocnemius. Using only these six muscles, locomotion can theoretically be achieved while the cat is in the harness system. From the EMG data, initial activity of the essential muscles during locomotion was obtained and plotted against the cat step cycle. (Author)

AD-A101 038/8 PC **A03**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
A Computer Model of Saccadic Suppression.
Final rept.,
William J. Ohley. Jan 81, 47p AFOSR-TR-81-0477
Grant AFOSR-80-0112

This work provides a quantitative model of saccadic suppression in which the suppression of vision is shown to result from direct interaction of the spatial and temporal properties of the human visual system. The model can be divided into a spatio-temporal impulse response function, and a psychophysical detection process. The space-time impulse response function is derived from the retinal line spread function and know temporal response characteristics of humans. By assuming linearity, the saccade like motion of a slit of light passing over the relina is convolved in two dimensions with the space-time function. Inclusion of a single threshold decision rule then allows excellent prediction of experimental results. (Author)

PAT-APPL-6-262 152 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Circuit for Calculating the Position of the Eye.
Patent Application,
Albert H. Marshall, and Gary M. Bond. Filed 11 May 81, 21p AD-D008 547/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An eye position measurement circuit is disclosed for calculating the position of the cornea of the human eye. The eye position measurement circuit includes a dual axis infrared light detector which will sense the position of the cornea of the eye upon receiving pulsed infrared light reflected from the cornea of the eye. The dual axis infrared light detector is, in turn, connected in unique combination with filters, absolute value circuits, analog-to-digital converters, latches, a digital computer, and other electronic components for calculating the position of the cornea of the human eye. (Author)

PB81-204836
(Order as PB81-204802, PC **A05**/MF **A01**)
Chinese People's Liberation Army Fourth Military Medical Coll., Chongqing. Dept. of Physiology.
Gold Thioglucose Hypothalamic Obesity Syndrome,
Zhengyu Qin. 25 Jul 78, 7p
Included in Kexue Tongbao, v25 n9 p790-796 Sep 80.

Experimental animal models for the study of obesity are of great significance to both endocrinological physiology and accelerating feeding domestic animals. The appetite regulating center has been shown in experimental animals to be bilateral and centered in the hypothalamus. It is often called the 'appestat'. Damage to the hypothalamus immediately creates a voracious appetic. It has been reported that there are separate centers for hunger (lateral and medial). The problem to work out a simple, safe and effective method so as to damage the ventromedial hypothalamus and to make an hypothalamic obesity model. Gold thioglucose (GTG) was used to damage glucose-sensitive tissue in the ventro-medial hypothalamus (VMH).

6Q. Protective Equipment

AD-A100 991/9 PC **A02**/MF **A01**
Webb Associates, Inc., Yellow Springs, OH.
Physiological Design Goals for Thermal Protection of Divers.
Interim rept.,
Paul Webb. Sep 80, 10p
Contract N00014-80-C-0193

The predecessor of this document was a report entitled 'PROPOSED THERMAL LIMITS FOR DIVERS: A Guide for Designers of Thermally Protective Equipment,' which was written in July 1976 and circulated informally. Since that date there has been considerable progress in physiological research and increased interest in diver thermal protection. Therefore, under the auspices of the Naval

Medical Research and Development Command, a conference was arranged to consider revisions of the original document. The purpose of the guidance provided is to set goals for the design of equipment. It is not intended as an acceptance standard or military specification. The design goals represent compromises between medical conservatism and freedom for the designer. They should be revised as new evidence becomes available. (Author)

PAT-APPL-6-244 842 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Upper and Lower Arm Load Simulator.
Patent Application,
Gerald J. Kron. Filed 18 Mar 81, 18p AD-D008 533/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is concerned with providing an upper and lower arm load simulator wherein the lower arm torque is produced by a pancake torque motor embedded within a flight suit modified with additional zippers to permit ease of installation. The torque motor transmits torque to the arms via an arrangement of plastic stays and struts sewn between cloth layers of the flight suit. Upper arm loading is produced by a torque motor driven tether line embedded within the flight suit slightly above the waistline. This unit serves to create shoulder torque, load the upper arm,. and retard forward movement of the elbow. Accordingly, it is an object of the invention to provide an upper and lower arm load simulator wherein the lower arm load is applied by a pancake motor embedded in the flight suit near the elbow and the torque is transmitted to the arm by means of a series of plastic stays and struts sewn between cloth layers of the flight suit.

PB81-222085 PC **A06**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Evaluation of Respiratory Protection in Coal Preparation Plants.
Contract rept. (Final).
Jul 80, 115p NIOSH-210-78-0085
Contract PHS-NIOSH-210-78-0085

Surface coal mine (SIC-1211) and preparation facility operations were studied to determine respirable dust and vapor hazards and the effectiveness of respiratory protective equipment. Eight coal preparation facilities were surveyed. Dust samples were taken at strip mining, raw coal processing, coal preparation and coal loading operations, and at quality control laboratories. Area and personal air samples and area samples of methyl isobutyl carbinol (108112) (MIBC) were collected and quantitative respirator fit tests were performed. Concentrations of respirable coal dust in excess of Mining Safety and Health Administration's (MSHA's) permissible exposure limits (PEL) were found only in one coal loader at one facility. Respirable dust concentrations ranged from 0.01 to 2.73 milligrams per cubic meter (mg/cu m). The highest concentrations were measured on workers performing surface mine and coal loading activities. Only 1 out of 80 personal samples was greater than 2mg/cu m. Out of 51 area samples of respirable coal dust, 15 exceeded the MSHA PEL. Only 72 percent of the workers tested used acceptable respiratory protection. The occurrence of facial hair was significant in the workers who did not obtain satisfactory protection. The authors recommend that engineering controls be implemented to reduce dust concentrations, and a respiratory protection program be implemented.

6R. Radiobiology

AD-A100 640/2 PC **A03**/MF **A01**
Spire Corp., Bedford, MA.
Automated Testing of Microprocessor Characteristics in Radiation Environments.
Final technical rept. 30 May 78-30 Jun 80,
Frederic L. Milder. Apr 81, 49p RADC-TR-80-394
Contract F19628-78-C-0118

Summary of tasks performed in compliance with contract requirements. In particular: initial results for automated test procedure for RCA CDP 1802 microprocessor; interfacing magnetic bubble memory to microcomputer and generating memory exercise procedures for radiation effects testing; setting up and testing basic elements of a centralized microprocessor automated testing facility; design and fabrication of portable, pulsed-exposure test system; adaptation of portable system to TMS 9900; software development for running test system with TMS 9900. (Author)

AD-A101 009/9 PC **A06**/MF **A01**
Letterman Army Inst. of Research, San Francisco, CA.
Assessment of Mutagenic Activity in Thermally Processed, Frozen, Electron-Irradiated, and Gamma-Irradiated Beef Using the Ames Salmonella/Mammalian Microsome Mutagenicity Assay.
Final rept. Jun 78-Apr 80,
Linda S. Guthertz, and John T. Fruin. Jun 81, 121p Rept no. LAIR-70

Studies were undertaken to determine the mutagenic activity of beef that had been thermally processed, frozen, electron-irradiated, and gamma-irradiated. The Ames Salmonella/mammalian microsome mutagenicity assay, with several modifications, was used. Considerable difficulties in performing the test and interpreting the results were encountered. Experiments conducted showed that on some occasions up to 80% of the apparent revertants were not true revertants. The meats contained water-soluble growth factors, particularly histidine, which apparently supported greater than normal growth and macrocolony formation. Subsequently, the level of histidine in the media was reduced by an amount equal to that contributed by the meats. Also, extracts of the meat were substituted for whole meats as test material for evaluation. Particulate matter from the whole meats made automated colony counting impossible and complicated manual counting. Data collected failed to demonstrate that any of the meats or processing techniques produced mutagens. It was concluded that the test had limited applicability to whole food items and that the use of thermally, frozen, electron-irradiated, and gamma-irradiated processing does not induce mutagenic potential in beef. (Author)

AD-A101 073/5 PC **A06**/MF **A01**
JRB Associates, Inc., McLean, VA.
Shot HOOD: A Test of the PLUMBBOB Series, 5 July 1957.
Final rept.,
Carl Maag, Martha Wilkinson, James Striegel, and Burt Collins. 27 Feb 81, 112p JRB-2-816-03-423-00, DNA-6002F
Contract DNA001-79-C-0473

This report describes the activities of DoD personnel, both military and civilian, in Shot HOOD, the 6th nuclear test in the PLUMBBOB atmospheric weapons testing series. The test was conducted on 5 July 1957 and involved participants from Exercise Desert Rock VII and VIII, AFSWP, AFSWC, and AEC test groups. This volume also describes the radiological safety criteria and procedures in effect at Shot HOOD.

AD-A101 081/8 PC **A03**/MF **A01**
Rochester Univ., NY. School of Medicine and Dentistry.
Microwaves and Human Leukocyte Function.
Final technical rept. Jan 80-Feb 81,
Norbert J. Roberts, Jr., Shin-Tsu Lu, and Sol M. michaelson. 19 Feb 81, 31p AFOSR-TR-81-0537
Grant AFOSR-80-0111

The objective of these studies is to determine whether exposure to microwaves (2450 MHz) affects the function of human leukocytes in the resting state and during antigenic or mitogenic challenge. This paper is a summary report of the construction and calibration of a waveguide exposure system for the exposure of human mononuclear leukocytes to 2450 MHz (CM) microwave energy. A description of the dual vial waveguide exposure facility for in vitro irradication of human leukocytes is presented. Calorimetric determinations of specific absorption rates (SAR) were made using heating curves measured with a microwave transparent Vitek 101 Electrothermia Monitor. The correlation between SAR and forward power was highly significant ($r = 0.95$). At a forward power of 0.55 W the averaged SAR was approximately 33 mW/m1. However, inhomogeneity and significant resonance absorption were noted in the dual vial waveguide exposure facility. A 30-point measurement of SAR distribution revealed that the SAR at any of the measured points could range between 0.12- and 3.94-fold of the average SAR within the given vial. Measurements indicated that this variability in SAR values did not create significant thermal gradients within the vials when external agitation was applied. (Author)

LA-8799-MS PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Nuclear Accident Dosimetry: Los Alamos Measurements at the Seventeenth Nuclear Accident Dosimetry Intercomparison Study at the Oak Ridge National Lab., DOSAR Facility, August 1980.
D. G. Vasilik, and R. W. Martin. Apr 81, 20p
Contract W-7405-ENG-36

Teams from various US and foreign organizations participated in the Seventeenth Nuclear Accident Dosimetry Study held at the Oak Ridge National Laboratory's (ORNL) Dosimetry Applications Research (DOSAR) facility August 11 to 15, 1980. Criticality dosimeters were simultaneously exposed to pulses of mixed neutron and gamma radiation from the Health Physics Research Reactor (HPRR). This report summarizes the experimental work conducted by the Los Alamos team. In-air and phantom measurements were conducted by the Los Alamos team using area and personnel dosimeters. Combined blood sodium and sulfur fluence measurements of absorbed dose were also made. In addition, indium foils placed on phantoms were evaluated for the purpose of screening personnel for radiation exposure. All measurements were conducted for unshielded, 5-cm steel and 20-cm concrete shielding configurations. All participant dosimeters were exposed at 3 m from the center of the HPRR core. (ERA citation 06:022860)

LBL-12555 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Biological Effects of Ionizing Radiation: Epidemiological Surveys and Laboratory Animal Experiments. Implications for Risk Evaluation and Decision Processes.
J. I. Fabrikant. Apr 81, 49p CONF-801258-1
Contract W-7405-ENG-48
Seminaire des evaluations des risques et processus de decision, Orsay, France, 17 Dec 1980.

General background is given for an understanding of the potential health effects in populations exposed to low-level ionizing radiations. The discussion is within the framework of the scientific deliberations and controversies that arose during preparation of the current report of the committee on the biological effects of ionizing radiation of the National Academy of Science - National Research Council (1980 Beir-III Report). (ERA citation 06:022694)

NUREG/CR-1478 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
PREREM: An Interactive Data Preprocessing Code for INREM II. Part I: User's Manual. Part II: Code Structure.
Technical rept.,
M. T. Ryan, and D. E. Fields. May 81, 73p
ORNL/NUREG/TM-422
Contract W-7405-eng-26

PREREM is an interactive computer code developed as a data preprocessor for the INREM-II internal dose program. PREREM is intended to provide easy access to current and self-consistent nuclear decay and radionuclide-specific metabolic data sets. Provision is made for revision of metabolic data, and the code is intended for both production and research applications. Documentation for the code is in two parts. Part I is a user's manual which emphasizes interpretation of program prompts and choice of user input. Part II stresses internal structure and flow of program control and is intended to assist the researcher who wishes to revise or modify the code or add to its capabilities. PREREM is written for execution on a Digital Equipment Corporation PDP-10

System and much of the code will require revision before it can be run on other machines.

PAT-APPL-6-267 312 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Optical Waveguide Dosimeter.
Patent Application,
Stanley Levine, Stanley Kronenberg, Harry Levine, William L. McLaughlin, and Carl R. Siebentritt. Filed 28 May 81, 8p AD-D008 538/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The general object of this invention is to provide a low-cost, portable dosimeter for personnel dosimetry that does not require maintenance and that can be used in civil defense emergencies. A further object of the invention is to provide such a dosimeter that does not require any power source or auxiliary equipment such as a readout device or charger. A still further object of the invention is to provide such a dosimeter that can be stored for long periods and be available instantly for use in case of an emergency. Another object of the invention is to increase the sensitivity of leuko dye dosimetry by several orders of magnitude to make it applicable for emergency personnel dosimetry where doses of 0 to 1000 rads (tissue) are of interest. It has now been found that the foregoing objects can be attained by incorporating a liquid solution of a leuko dye as the core of an optical wave guide. The optical wave guide dosimeter includes the liquid solution of leuko dye hermetically sealed in flexible and transparent plastic tubing.

PB81-806994 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biological Effects of Microwaves. 1978-June, 1981 (Citations from the NTIS Data Base).
Rept. for 1978-Jun 81.
Jul 81, 129p
Supersedes PB80-808256, and NTIS/PS-79/0433.

The selected abstracts cover the biological effects on man and animals from exposure to microwaves. In addition to dosages and tolerances, regulations, and standards are included. (This bibliography contains 122 citations, 34 of which are new entries to the previous edition.)

PNL-SA-9333 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Historical Perspectives on Limits for Internal Emitters.
W. J. Bair. 1981, 41p CONF-810365-1
Contract AC06-76RL01830
Joint meeting of the Columbia and Northern California chapters of the Health Physics Society on internal dosimetry, Lake Tahoe, CA, USA, 22 Mar 1981.

An historical perspective on the development of exposure limits for internal emitters is given. The emphasis of the presentation is on concepts rather than on a chronological sequence of events. (ERA citation 06:022861)

6S. Stress Physiology

AD-A100 582/6 PC **A19**/MF **A01**
Undersea Medical Society, Inc., Bethesda, MD.
Thermal Constraints in Diving.
1 Apr 81, 441p Rept no. UMS-PUB-44WS(TC)
Grant N00014-80-G-0056
Proceedings of the Undersea Medical Society Workshop (24th), Bethesda, MD. 3-4 Sep 80.

Despite considerable investigation since the 1974 UMS Workshop, the relationship between body heat loss and core temperature change in cold water exposure has not been definitively elucidated. The relationship appears to be dependent on the rate of cooling in that loss of a given amount of heat at a rapid rate causes a greater drop in rectal temperature and more shivering as compared to loss of the same heat over a longer time which results in little rectal temperature drop, no shivering and only minor complaints of mild cold stress. Although the performance decrement associated with each type of exposure remains to be determined, there has not yet been any explanation of this documented effect of rate of cooling. The effect is pertinent not only to use of the rectal temperature but is applicable to various core temperature measurement sites. New experiments were described that documented the relationship between individual body size and fatness characteristics and cooling rate. For the same body mass and height, variation of body fat was shown to cause a large variation in rectal temperature decrease and heat loss; the fatter the individual, the less the change. For the same body fat percentage, variation of body mass and height has a large effect in rectal temperature and heat loss; the larger the individual, the less the change. People of identical skinfold thickness and sex have enormous differences in rates of cooling.

AD-A100 903/4 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Alterations in Mouse Fecal Flora Associated with Hyperbaric Stress.
Medical research progress rept.,
O. P. Daily, and J. D. Gillmore. Aug 80, 12p Rept no. NMRI-81-20
Pub. in Undersea Biomedical Research, v8 n1 p23-31 1981.

No abstract available.

AD-A100 918/2 PC **A10**/MF **A01**
Dayton Univ., OH. Research Inst.
Techniques and Procedures Applied to Photometric Methods for the Analysis of Human Kinematic Responses to Impact Environments.
Final rept. 1 Sep 76-30 Apr 79,
Philip A. Graf, and Henry T. Mohlman. Oct 80, 209p UDR-TR-79-115, AFAMRL-TR-80-61
Contract F33615-76-C-0525

This report presents the methods, techniques, and procedures developed and applied to photometrically evaluate the biodynamic responses of body segments to laboratory simulations of aircraft crash and escape system environments. These simulations were developed on the Horizontal Impulse Accelerator, the Hydraulic Decelerator, and the Body Positioning Retraction Device, all of which are facilities of the Biomechanical Protection Branch of the Air Force Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, by personnel of that organization. Application of these methods and techniques resulted in time histories of coordinate positions, relative to the test seat, of anthropometric points during the impact and response periods.

AD-A100 927/3 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
Current Concepts of Inert Gas Exchange and Decompression.
Medical research Progress rept.,
P. K. Weathersby, and L. D. Homer. May 81, 15p Rept no. NMRI-81-18
Pub. in Underwater Physiology VII; Proceedings of the Symposium on Underwater Physiology (7th), p687-698 1981.

No abstract available.

AD-A100 928/1 PC **A02**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
A View of Some Fundaments of the High Pressure Nervous Syndrome.
Medical research progress rept.,
J. M. Hallenbeck. 1981, 14p Rept no. NMRI-81-17
Pub. in Underwater Physiology VII, p305-316 1981.

No abstract available.

AD-A101 171/7 PC **A03**/MF **A01**
National Research Council, Washington, DC. Committee on Hearing, Bioacoustics and Biomechanics.
The Feasibility of a National Biomechanics Data Bank.
Feb 81, 31p
Contract N00014-80-C-0159

The major source of mortality and morbidity of the young adult population in industralized nations is due to impact acceleration from vehicular accidents. One strategy to reduce the mortality and morbidity is the use of protective devices to limit the loads applied to human occupants. The main thrust of a national biomechanics data bank at this time is toward biomechanical and injury data judged to be important for the reduction of mortality and morbidity. Because biomechanical data are expensive to gather, the mutual sharing of such data among laboratories is extremely important and could be accomplished through the establishment of a national biomechanics data bank. However, since the development of a national facility would take time and would itself be extremely expensive, the group feels that the interim measure of standardizing among the several small existing data banks is needed. This would permit retrieval of data from any small bank that is in a format common to the others in terms of nomenclature, units of measure, anatomical coordinate systems, and quality estimates. The common format would then permit eventual collation of small bank data into the national bank with minimal difficulty. (Author)

6T. Toxicology

AD-A100 682/4 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
Effect of Addition of Calcium Chloride to Larval Medium on Survival of Immature Snow-Melt Aedes (Diptera: Culicidae).
Final rept. 1 Oct 79-1 Oct 80,
James T. Kardatzke. 1980, 3p
Pub. in Mosquito News, v41 n1 p11-12 Mar 81.

No abstract available.

AD-A100 844/0 PC **A03**/MF **A01**
Cincinnati Univ., OH. Coll. of Medicine.
Membrane Associated Phenomena Associated with Staphylococcal Enterotoxins.
Final rept. 15 Apr 78-15 Apr 81,
Peter F. Bonventre. Jun 81, 30p ARO-15426.3-L
Grant DAAG29-78-G-0087

Research was conducted to determine if staphylococcal enterotoxins exert any cytotoxic effects on a human intestinal epithial cell line in vitro and demonstrate specific toxin binding to murine lymphocytes via specific toxin receptors on the cell membrane. (Author)

AD-A101 019/8 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Toxic Hazards in Aviation.
Conference proceedings.
Apr 81, 133p Rept no. AGARD-CP-309
Presented at the Aerospace Medical Panel Specialist's Meeting, Toronto (Canada), 15-19 Sep 80.

The aviation environment has always contained many toxic materials and products. With the evolution of more advanced aircraft propulsion mechanisms, specialised aircraft material development and associated maintenance activities, there has been a major increase in the potential toxic hazards associated with these systems. The threat of toxic exposure covers the entire spectrum of low-level continuous or intermittent to high-level brief accidental or unavoidable exposures. However, the protection of the crew and passengers is not the only concern in dealing with the toxic hazards in aviation. Responsibilities include research to address the biomedical aspects of occupational health and safety standards, toxic substances, environmental impact criteria and classification of transportation. (Author)

AD-A101 062/8 PC **A02**/MF **A01**
Indiana Univ.-Purdue Univ. at Indianapolis.
The Teratogenic Effects of the Fuel JP-10 on the ICR Mice.
Final rept.,
Robert D. Lyng. 31 Mar 81, 8p AFOSR-TR-81-0541
Grant AFOSR-80-0093

JP-10 is a synthesized fuel for Cruise Missiles. It is the exoisomer of 4, 7-methano-1H-indene, octahydro 12a alpha, 4 alpha, 7 alpha, 7a alpha, (CA 2825-83-4). Pregnant ICR mice were given oral doses of 0.2, 0.4, 0.6 and 0.8 ml/kg on days 6 through 9 of gestation. No significant differences were found between controls and experimental groups in mean implants/female, mean viable fetuses/litter, mean resorptions/litter, frequency of resorptions, frequency of soft tissue anomolies and frequency of skeletal anomalies. Mean fetal weight was significantly heavier in the 0.2 and 0.4 ml/kg groups. This effect is difficult to explain when the 0.6 and 0.8 ml/kg groups showed no increase in fetal weight. (Author)

CONF-810253-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Animal Methods for Toxicity Testing.
R. A. Griesemer. 1981, 17p
Contract W-7405-ENG-26
Symposium on trends in bioassay methodology, Washington, DC, USA, 18 Feb 1981.

The present use of animals in toxicity testing is described. The advantages and limitations of using animals are indicated. (ERA citation 06:024417)

DE81023865 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Chronic Dermal Toxicity of Epoxy Resins. I. Skin Carcinogenic Potency and General Toxicity.
J. M. Holland, L. C. Gipson, M. J. Whitaker, B. M. Eisenhower, and T. J. Stephens. Jun 81, 98p
ORNL-5762
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

This report quantifies the cutaneous and systemic response of male and female C3H mice to skin application of selected commercial epoxy resins and amine curing agents, at the maximum tolerated dermal dose (MTDD). Resins tested were: diglycidyl ether of bisphenol A (DGEBA) (CAS no. 1675-54-3); mixtures of the same resins with bis(2,3-epoxycyclopentyl) ether (CAS no. 2386-90-5; diglycidyl ether of resorcinol (CAS no. 101-90-6); N,N'-diglycidyl-5,5-dimethylhydantoin (CAS no. 15336-81-9); diglycidyl ether of neopentyl glycol (CAS no. 17557-23-2); A 70:30 mixture of the hydantoin and neopentyl glycol base resins; the amine curing agent menthane diamine (CAS no. 80-52-4); and a dutectic mixture of meta-phenylenediamine (CAS no. 108-45-2) and DGEBA. A DGEBA manufactured by Union Carbide Corporation (Material E, Appendix A) in the mid-1970's and assayed for skin carcinogenicity previously was chemically characterized. The results of this analysis are included with the present data for comparison purposes. Background information on the special statistical methods used is presented in Appendix C. (ERA citation 06:024384)

DE81023869 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Publications in Life Sciences Synthetic Fuels of Oak Ridge National Laboratory.
L. W. Rickert, and J. L. Seiber. Jun 81, 142p
ORNL/TM-7680
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

This list of publications represents the principal elements of the Life Sciences Synthetic Fuel Program at Oak Ridge National Laboratory, namely: (1) characterization, measuring, and monitoring research to develop sampling and analytical techniques and surveillance instrumentation; (2) industrial hygiene efforts to identify and monitor potential health hazards to employees; (3) biological studies centered on the identification and screening of potentially hazardous materials and assessment of dose-response relationships for chronic or acute exposures; (4) environmental transport analyses to investigate material dispersion, reconcentration, and impact on biological communities; (5) environmental control research to develop techniques for effluent and emission reduction; and (6) assessments concerned with optimizing plant siting and operation through development and applications of methods for risk analysis. Publications are listed by author and by division affiliation. A permuted title index and a broad subject index are included. (ERA citation 06:024419)

DE81023992 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Lack of Effect of 60-Hertz Fields on Growth of Cultured Mammalian Cells.
R. A. Tobey, H. J. Price, L. D. Scott, and K. D. Ley. May 81, 9p LA-8831-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

An initial series of studies carried out with a vessel which permitted exposure of cultured CHO cells to 1 mV/m 60-Hz fields yielded a pronounced reduction in growth rate. Because of suspicions that the effects on growth were due to something other than the 60-Hz field, the initial chamber was examined for generation of arcing and coronal effects, and a modified chamber yielding the same order of magnitude of 60-Hz field, but free of electrical artifacts, was utilized for growth studies. The results obtained demonstrated that the effects on growth observed with the initial chamber did not result from the electric field, but instead appeared to be attributable to arcing and coronal effects. (ERA citation 06:024412)

PB81-213381 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Hematologic and Immunologic Studies of Humans Exposed to SO2,
Mirdza L. Peterson, Shirley Harder, Delores Elliott, Velva Milholland, and Geraldine Orlando. Jun 81, 22p EPA-600/1-81-047

Immunologic and hematologic parameters were used to evaluate the effects in humans of a single 2 hour exposure to either clean air or 0.75 ppm SO2. Venous blood Samples were obtained before, immediately after, and 24, 48, and 72 hours following the end of exposure. Parameters studied included complete blood counts, enumeration of lymphocyte populations using surface membrane receptor markers, evaluation of lymphocyte mitogen stimulated response, and concentration of secretary immunoglobulin A (s-IgA) content of nasal washings. No statistically significant changes were seen in s-IgA, blood erythrocytes or immunologic parameters examined. A possibly significant decrease was found in monocytes 48 hours following SO2 exposure, but this recovered after 72 hours. A stimulatory effect (not statistically significant) was noted at 48 and 72 hours post-SO2 in s-IgA and in lymphocyte numbers bearing receptors for the Fc portion of IgG, while a decrease occurred in active T-lymphocytes with receptors for sheep red blood cells.

PB81-215352 PC **A03**/MF **A01**
Karolinska Inst., Stockholm (Sweden).
A Study of Uremic Toxins.
Final rept. 3 Jan 79-30 Jun 80,
Jonas Bergstroem, Peter Fuerst, and Lena Zimmerman. May 81, 38p AK-6-2-2215-81
Contract N01-AM-2-2215

By using an automatic analytical system endogenous middle molecules were quantitatively determined. Relationships between MM levels in plasma and various clinical parameters in non-dialyzed as well as dialyzed uremic patients were assessed. We found that symptomatic patients (with edema, infection, vomiting, malnutrition and pericarditis) had higher levels of certain MM-fractions in plasma than non-symptomatic controls with the same degree of renal impairment, thus indicating that there is an association between uremic 'sickness' and accumulation of middle molecules. In the dialysis patients 'sickness' was on a statistical basis to a higher degree associated with accumulation of middle molecules than with accumulation of urea and creatinine. Renal clearance of middle molecule fractions were similar to creatinine clearance or slightly higher. Azotemic patients excreted more peak 7c material than did normal subjects and the exretion rates varied more from patient to patient in the azotemic population. By using preparative chromatography, N-terminal and C-terminal amino acid determination, partial hydrolysis, amino acid analysis, isotachophoresis, high voltage paper electrophoresis, gas chromatography/masspectrometry, masspectrometry (direct inlet probe) and elemental analysis, the main fraction of 7c could be fully defined and was found to be glucuronidated o-hydroxy-benzoylglycine with a molecular weight of 371 daltons. The structure has been confirmed by synthesizing the compound and subjecting it to the analytical procedures.

PB81-216822 PC **A04**/MF **A01**
Minnesota Univ., Minneapolis.
Response of Phytoplankton to Acidification in Experimental Streams.
Master's thesis,
Thomas Walter Weber, II. Jun 81, 52p EPA-600/3-81-042

In order to examine the response of stream phytoplankton communities to acidification, three artificial streams along the Mississippi River were sampled at biweekly intervals. This study took place at Monticello, Minnesota, during late spring-early summer, 1979. One stream served as a control with an ambient pH of 8.1, and two streams were maintained at pH 6.3 and 5.3 by the addition of sulfuric acid. The streams provided a unique replicate system whereby physical and chemical parameters could be controlled and continually monitored in a field situation. The phytoplankton samples were filtered onto membrane filters and the constituent phytoplankton species were enumerated. The diversity of phytoplankton was similar throughout all three pH regimes. However, phytoplankton community similarity decreased over the course of the six week experimental period. Biomass, measured by in vivo chlorophyli fluorescence and as the density of the algal cells, showed a similar pattern. The pattern of algal community development differed across the pH treatments. The phytoplankton at pH 6.3 and 8.1 attained their maximum biomass during the first month of sampling (June). There is a lag in the population maxima of phytoplankton at pH 5.3, possibly due to a slower division rate caused by a less than ideal pH environment. Species composition was nearly identical across the pH range, dominated by diatoms in each stream. The most extreme pH value, pH 5.3, seemed to be a sublethal value for the diatoms existing there.

PB81-222366 PC **A04**/MF **A01**
EG and G Bionomics, Wareham, MA.
Reduction of Toxicity to Aquatic Organisms by Industrial Wastewater Treatment.
Journal article,
George A. Cary, and Michael E. Barrows. Jul 81, 72p EPA-600/3-81-043
Contract EPA-68-03-2631

The specific goal of this research was to conduct 24-hour static acute bioassays with 'untreated' influent and 'treated' effluent using fathead minnows (Pimephales promelas) and water flea (Daphnia magna) to biologically evaluate the effectiveness of industrial wastewater facilities in reducing effluent toxicity to aquatic organisms. Of primary interest to the EPA was an evaluation of the capacity of the wastewater treatment facilities of the pesticide industry for reducing toxicity. To accomplish the stated goal, on-site 24-hour static acute toxicity tests were performed during ten consecutive workdays at seven industrial sites. Five of the test sites are defined as pesticide manufacturers, while the remaining sites consisted of an organo-chemical manufacturer and a bleached-kraft paper mill. The effectiveness of the treatment plants was determined by performing static acute toxicity tests with the fathead minnow (Pimephales promelas) and the water flea (Daphnia magna) on samples of the wastewater collected before and after treatment. Results of the studies are expressed in terms of both median lethal concentrations (LC50's) as % effluent and lethal units. The data from these studies indicate that the wastewater treatment plants provided an average efficiency of 98% in reducing the toxicity of 'untreated' wastewaters. Neither species tested proved to be a more sensitive indicator of toxicity, though a larger data base is required to make valid appraisal. Of interest was the observation that while some wastewater treatment facilities provide good efficiency (98+%) in reducing toxicity, the resulting effluent still represented a relatively high number of lethal units. This was a result of the fact that the 'untreated' influent entering the waste treatment system contained a very high level of lethal units and a subsequent 98% reduction of that level still resulted in a toxic wastewater.

PB81-222382 PC **A03**/MF **A01**
North Carolina Univ. at Chapel Hill. School of Medicine.
New Approaches to Quantitating the Pulmonary Effects of Inhaled Pollutants.
Final rept. 25 Jul 77-24 Jul 80,
Philip A. Bromberg, R. C. Boucher, M. Friedman, M. J. Hazucha, and R. L. Pimmell. Jul 81, 33p
EPA-600/1-81-052
Grant EPA-R-805184

The authors have developed a variety of non-invasive and other techniques to study effects of inhaled pollutants on the lung. In the area of airway mechanics they have developed and applied a diameter gauge to make continuous measurements of large airways caliber. The gauge provides an electric output. The authors have also developed and validated rapid methods for non-invasively measuring respiratory mechanics using forced random noise excitation at the mouth. The resulting respiratory impedance data are applied to appropriate models to obtain values for parameters such as 'central' and 'peripheral' airways resistance. In the area of repiratory epithelial function they have developed a nontraumatic technique to measure transepithelial potential difference across respiratory (nasal and airways) epithelium. The authors have also measured tracheal epithelial permeability in vivo, demonstrating increased permeability and decreased permselectivity in guinea pigs exposed to 4 ppm, 1 ppm and 0.3 ppm O3. In the area of pulmonary vasculature, they have developed a rapid noninvasive multi-gas rebreathing technique to measure lung water and used it to develop an O3 - induced pulmonary caine model of delayed pulmonary edema using 1 ppm O3.

PB81-222408 PC **A02**/MF **A01**
Creighton Univ., Omaha, NE.
Ozone Exposure and Pulmonary Metabolic Effects of Mediators and Hormones.
Final rept. 20 Nov 76-31 Aug 80,
Ibert C. Wells. Jul 81, 25p EPA-600/1-81-051
Grant EPA-R-804585

Several physiological effects of ozone exposure involving smooth muscle contracting substances have been studied in Sprague-Dawley derived, male rats whose body weights were in the range of 180-250 grams and whose ages were in the range of 45-60 days. The ozone concentration of interest was 0.5-1.0 ppm and the exposure time was four hours. However, higher concentrations of ozone and longer exposure times were sometimes employed. It was observed that the exposure of these rats to ozone concentrations of 0.5 or 1.0 ppm for 4.0 hours produced the following effects in their lungs: (a) caused the release of prostaglandin F2 alpha (PGF2 alpha) and thromboxane A2 (TXA2), (b) increased the angiotensin converting enzyme activity, and (c) decreased the uptake of serotonin from the blood. Histamine and slow reacting substance of anaphylaxis (SRS-A) were not released nor was the histamine forming capacity of the lung altered. Edema formation was observed in the rats from one supplier, but not in those from another and succinoxidase activity was observed to be decreased by short exposure to ozone and increased by long exposure, as reported by previous investigators.

PB81-223547 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Extent-Of-Exposure Survey of Methyl Chloride.
Technical rept.
Joel M. Cohen. Sep 80, 45p DHHS/PUB/NIOSH-80-134
Contract PHS-NIOSH-210-76-0158

Industrial exposures to methyl chloride (74873) are discussed. The toxic effects of methyl chloride are reviewed along with analytical procedures for collection and analysis of methyl chloride samples. Several workplaces that use methyl chloride are described, together with various industrial applications of the chemical. Jobs requiring the use of methyl chloride are identified, and current industrial hygiene and safety practices, including engineering controls, work practices, administrative controls, and biological and environmental sampling and control procedures are described. Chemical and physical data for methyl chloride is presented. The results of detailed industrial hygiene surveys at four United States facilities where the chemical is used are included.

PB81-223653 PC **A05**/MF **A01**
Illinois Univ. at Chicago Circle.
Mortality Study of Pesticide Manufacturers/ Formulators: Documentation of the Velsicol Chemical Company, Memphis, Tennessee Cohort.
Contract rept.,
David P. DiTraglia. 1979, 100p NIOSH-210-76-0173
Contract PHS-NIOSH-210-76-0173

The effects of pesticide exposure were studied in workers employed at the Vesicol Chemical Company (SIC-2879) in Memphis, Tennessee. Data was collected including a list of jobs and departments and work histories. The study group comprised workers with at least 6 months of factory experience prior to the end of 1964. Workers were classified into four study cohorts comprising all workers employed for 6 months or more. Standardized mortality ratios workers employed for 6, 12, or 36 months or more. Standardized mortality ratios (SMRs) were measured according to exposure. As exposure length increased SMR increased substantially. For all malignant neoplasms, SMRs were 91, 95, 100 and 110 percent in cohorts 1, 2, 3, and 4, respectively. For neoplasms of the respiratory system SMRs were 122, 128, 133 and 146 percent in cohort 1, 2, 3 and 4, respectively. Three deaths occurred from malignant neoplasms of the respiratory system, after 10 and 20 years of employment. The authors conclude that the data is not complete and recommend that measures be taken to complete it. If this is not possible, the cohorts should be followed up and the data reexamined.

7. CHEMISTRY

7A. Chemical Engineering

DE81023253 PC **A07**/MF **A01**
Merix Corp., Wellesley, MA.
Comparison of Sequential Flash and Conventional Crude Oil Distillation Processes.
T. W. Mix, J. S. Dweck, J. W. Staigerwald, and I. J. Eilands. Jul 80, 142p DOE/EC/01584-4
Contract AC07-76CS40259
Microfiche only after original copies are exhausted.

A sequential flash crude distillation process is compared with conventional technology for both grassroots and retrofit refinery application. Two versions of the sequential flash process, a dry one and a wet one (requiring steam), are discussed. The sequential flash process is concluded to be operationally sound and likely to be energy conservative and to offer favorable economics for modernization and expansion of a number of refineries. Selection of a specific refinery for demonstration of the sequential flash technology is recommended, with a go-ahead on the demonstration being contingent on an analysis confirming both energy conservation and superior economics to result from retrofit with sequential flash processing instead of conventional processing. (ERA citation 06:023126)

DE81023264 PC **A06**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of Processes for the Production of Solar-Grade Silicon from Halides and Alkali Metals. Final Report, October 1979-February 1981.
C. R. Dickson, R. K. Gould, and W. Felder. Mar 81, 108p DOE/JPL/955491-81/6, AeroChem-TP-410
Contract NAS-7-100-955491
Microfiche only after original copies are exhausted.

Processes were developed involving high temperature reactions of silicon halides with alkali metals for the production of solar grade silicon in volume at low cost. Experiments were performed to evaluate product separation and collection processes, measure heat release parameters for scaling purposes, determine the effects of reactants and/or products on materials of reactor construction, and make preliminary engineering and economic analyses of a scaled-up process. The process was found to have a low manufacturing cost and the lowest plant cost of all the present JPL sponsored processes, and produces the silicon product at the low price of $10/kg in 1980 dollars. The kinetics and mechanism of the formation and growth of silicon particles from the decomposition of silane at high temperatures is characterized. The experiments were aimed at determining the rates at which gas-phase species form silicon particle precursors, the time required for silane decomposition to produce particles, and the competing rate of growth of silicon seed particles injected into a decomposing silane environment. A high-temperature fast-flow reactor was modified to study the decomposition of silane and the subsequent growth of particles. Optical diagnostics consisting of absorption and Mie scattering of the light at 90 exp 0 from He-Ne or Ar exp + lasers were used to determine the appearance growth rates and absolute sizes of the particles. The extent of silane decomposition as a function of residence time, temperature, and pressure was measured by infrared absorption spectroscopy. A simplistic model is presented to explain the growth of silicon in a decomposing silane environment. (ERA citation 06:023275)

DE81023265 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Large-Area Sheet Task: Advanced Dendritic-Web Growth Development. Quarterly Report, January 1-March 31, 1981.
C. S. Duncan, R. G. Seidensticker, J. P. McHugh, R. H. Hopkins, and D. Meier. 30 Apr 81, 56p
DOE/JPL/955843-81/2
Contract NAS-7-100-955843
Microfiche only after original copies are exhausted.

During this quarter, design of the prototype automated web growth furnace neared completion; layout and detailed drawings of the mechanical components are 90% completed. Mechanical items have undergone design change to reduce cost. Several changes to improve the electronic functioning of subsystems have been implemented. A new melt level control system has been implemented to provide stepless silicon feed rates from zero to rates exactly matching the silicon consumed during web growth. Bench tests of the unit were successfully completed and the system mounted in a web furnace for operational verification. Tests of long-term temperature drift correction techniques were made; web width monitoring seems most appropriate for feedback purposes. We successfully tested a system to program the initiation of the web growth cycle. A low-cost temperature controller was tested which functions as well as units four times as expensive. A design of a recessed growth lid combining features of improved growth speed plus improved starting behavior was experimentally operated for the first time. The predicted improvements were verified. Web crystals constant in width to a fraction of a millimeter were grown using passive width control tecniques. Further growth was limited only by the lack of melt replenishment hardware on the furnace, a feature now being changed. (ERA citation 06:023278)

DE81023780 PC **A05**/MF **A01**
Braun (C.F.) and Co., Alhambra, CA.
Factored Estimates for Eastern Coal Commercial Concepts. Interim Report: Joint Department of Energy-Gas Research Institute Coal Gasification Program.
Sep 78, 89p DOE/ET/10250-T1, HCP/T-2240-31,FE-2240-31
Contract AC01-76ET10250
Microfiche only after original copies are exhausted.

Conceptual commercial designs were prepared for BI-GAS, HYGAS Steam-Oxygen and Steam-iron, and Synthane processes to compare the economics with the conventional Lurgi process. Of these processes, only the Lurgi process is commercially

available. With the exception of the Lurgi process, the conceptual plant designs are not based on pilot plant data, but rather are derived from computerized projections of bench-scale and PDU data. It should be appreciated that the computerized projections for the BI-GAS, HYGAS Steam-Oxygen, HYGAS Steam-Iron, and the Synthane processes do not ensure that these processes can be operable at conditions assumed for preparation of these cost estimates. For each of these five processes, capital costs and the cost of operation using an eastern bituminous coal have been estimated to determine the cost of pipeline gas. The accuracy of these Total Plant Investment estimates is estimated to be +-20%. The significance of variations between costs of the processes presented should be considered in the light of this accuracy. Variations in gas costs of all second generation processes from $3.64 to $3.94 per million Btu are probably only indicative rather than significant. The study indicates that these processes might be less costly than the Lurgi process - the gas cost of which is estimated at $4.66 per million Btu. (ERA citation 06:023008)

DE81024019 PC **A04**/MF **A01**
Aerospace Corp., Germantown, MD.
Oil Shale Surface Retorting: Environmental Characterization Information Report.
Jan 81, 68p DOE/EP-0015
Contract AT03-76EV74010
Microfiche only after original copies are exhausted.

This Environmental Characterization Information Report (ECIR) for Oil Shale, Surface Retorting: Paraho Process (Direct Mode) has been prepared from the latest available environmental and technical information collected from a number of sources. The plant chose for characterization is a 50 x 10 exp 3 bbl/day syncrude equivalent facility using the Paraho Process (Direct Mode). The process, assumed plant operating parameters, resources needed, and the environmental residuals and products associated with the plant are presented. Annual resource usage and pollutant discharges are shown in English and metric units, assuming an annual plant capacity factor of 90%. In addition to annual quantities, the summary table gives quantities in terms of 10 exp 12 Btu of energy (syncrude) produced for comparison between different energy processes. Twenty-one environmental points of interest are discussed individually. (ERA citation 06:023156)

DOE/ET/10069-T4 PC **A15**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development. Phase V. Quarterly Technical Progress Report, July 1-September 30, 1980.
Feb 81, 338p FE-2893-57
Contract AB01-77ET10069

This report is the tenth Quarterly Technical Progress Report for US Department of Energy Cooperative Agreement No. DE-FC01-77ET10069 (formerly EF-77-A-01-2893) for Exxon Donor Solvent (EDS) Coal Liquefaction Process Development - Phase V. The Laboratory Process Research and Development studies were conducted at various Exxon Research and Engineering Co. (ER and E) facilities: Research and Development Division at Baytown, Texas; Products Research Division at Linden, New Jersey; and the Exxon Research and Development Laboratories at Baton Rouge, Louisiana. The Engineering Research and Development studies were performed at the Synthetic Fuels Engineering and Exxon Engineering Technology Departments of ER and E at Florham Park, New Jersey. The information dealing with the Management, Detailed Engineering, and Procurement activities related to revamp of the FLEXICOKING Prototype Unit was generated at Exxon Company, USA, Houston, Texas, and Exxon Engineering - Project Management Department of ER and E, Florham Park, New Jersey. The information dealing with operation of the 250 T/D Exxon Coal Liquefaction Pilot Plant (ECLP) was generated at Exxon Company, USA, Houston, Texas. (ERA citation 06:019631)

DOE/ET/13050-T2 PC **A10**/MF **A01**
Conoco, Inc., Stamford, CT.
Pipeline Gas Demonstration Plant. Phase I. Annual Technical Progress Report, July 1, 1979-June 30, 1980.
1980, 205p FE-2542-30
Contract AC01-77ET13060

Contract No. EF-77-C-01-2542 between Conoco Inc., and the US Department of Energy requires Conoco Inc. to design, construct, and operate a demonstration plant for the manufacture of high-Btu gas from bituminous coal. The project is currently in the design phase, which is scheduled for completion by June 30, 1981. During the reporting period of July 1, 1979 through June 30, 1980 the main accomplishments were: near completion of Task II, Demonstration Plant Process Design; Task IV, Demonstration Plant Environmental Analysis, was completed and the Environmental Analysis Report (FE-2542-25 Vols. 1 through 6) was issued; applications have been filed for Prevention of Significant Deterioration (PSD) Permit, Permit to Install (PTI), National Pollution Discharge Elimination System (NPDES) Permit and Permit to Build the Water Intake; DOE has approved all but two of the proprietary process licenses required for the Demonstration Plant; and Conoco Inc. has implemented a configuration and resource control plan to manage engineering change, cost growth, and schedule slippage in the engineering tasks. The main design effort in the final year of Phase I will be directed to Task VI, Demonstration Plant Engineering Design; Task VII, Construction Planning; and Task X, Long Lead Time Items. (ERA citation 06:021495)

DOE/ET/13382-T2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemical Engineering.
Studies of Molten-Salt-Catalysed Coal Gasification. Final Technical Report.
H. Saltsburg. 13p
Contract FG21-78ET13382

A measurement of the properties of the gasification catalyst itself, which has been made for the first time, provides several insights into the mechanism which were not previously obtainable other than as speculation. The measurement of the oxygen activity in the melt systems demonstrates that for the CO sub 2 based gasification: a) The mechanisms which involve the metal or metal cation in a significant way are inappropriate. b) The effectiveness of solid HOH and Li sub 2 O must be in their ready conversion to carbonates. and c) Therefore, the increased activity of Li sub 2 CO sub 3 relative to K sub 2 CO sub 3 is a result of the m.p. being lower permitting more effective dispersion of the catalyst over the carbon surface rather than an intrinsic difference due to differences between Li exp + and K exp + . It is interesting to note that in other catalytic systems in which alkali metal cations have an effect on the catalytic activity of another material (e.g., Li sub 2 S sub 2 O sub 7 vs K sub 2 S sub 2 O sub 7 on V sub 2 O sub 5 for oxidation of benzene to maleic anhydride exp 8) the Li salt is typically a poison. (ERA citation 06:023042)

DOE/FC/10066-T1(V.4) PC **A11**/MF **A01**
Energy Resources Co., Inc., Walnut Creek, CA.
Low-Rank Coal Study. Volume 4. Regulatory, Environmental, and Market Analyses.
Nov 80, 241p
Contract AC18-79FC10066

The regulatory, environmental, and market constraints to development of US low-rank coal resources are analyzed. Government-imposed environmental and regulatory requirements are among the most important factors that determine the markets for low-rank coal and the technology used in the extraction, delivery, and utilization systems. Both state and federal controls are examined, in light of available data on impacts and effluents associated with major low-rank coal development efforts. The market analysis examines both the penetretion of existing markets by low-rank coal and the evolution of potential markets in the future. The electric utility industry consumes about 99 percent of the total low-rank coal production. This use in utility boilers rose dramatically in the 1970's and is expected to continue to grow rapidly. In the late 1980's and 1990's, industrial direct use of low-rank coal and the production of synthetic fuels are expected to start growing as major new markets. (ERA citation 06:021567)

DOE/JPL/954355-81-17 PC **A03**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
Large-Area Silicon Sheet by EFG. First Quarterly Report, January 1, 1981-March 31, 1981.
29 May 81, 43p
Contract NAS-7-100-954355

A multiple growth run with three 10 cm cartridges was carried out with the best throughput rates and time percentage of simultaneous three-ribbon growth achieved to date in this system. Growth speeds were between 3.2 and 3.6 cm/minute on all three cartridges and simultaneous full-width growth of three ribbons was achieved 47% of the time over the eight-hour duration of the experiment. Improvements in instrumentation and in the main zone temperature uniformity have been two factors that have led to more reproducible growth conditions in the multiple ribbon furnace. Factors influencing ribbon quality are being investigated through the study of the effect of ambient gas species and concentrations on material properties. Growth of ribbon with the cold shoes characteristic of the high-speed systems has shown that the properties of this ribbon respond to ambient changes in much the same way as when no cold shoes are present. The best cell efficiencies attained for 10 cm wide ribbon grown with cold shoes are still below those obtained without cold shoes (10 to 11% versus 12 to 13%, respectively). It has also been shown in these experiments that meniscus CO sub 2 and quartz introduced in the melt (contained in graphite crucibles) are equivalent in improving the electronic quality of the ribbon in these systems. Development of a system to grow 10 cm wide ribbon in the speed range from 3 to 4 cm/minute without the use of the conventional cold shoes is underway. Work on building a new multiple furnace for growth of four 10 cm wide ribbons has been started. (ERA citation 06:023272)

DOE/RA/20222-T2 PC **A10**/MF **A01**
Philadelphia Gas Works, PA.
Low/Medium Btu Coal Gasification Assessment of Central Plant for the City of Philadelphia, Pennsylvania. Final Report.
Feb 81, 203p
Contract FG01-79RA20222

No abstract available.

EPRI-CS-1469 PC **A09**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Materials Problems in Fluidized-Bed Combustion Systems: Review of the Information on Gas Turbine Materials in Coal Combustion Environments.
R. L. McCarron, and D. A. Grey. Aug 80, 183p

This report condenses into a single document the available information related to the performance of gas turbine materials operated in the effluent from the combustion of coal. The information summarized originated from three sources: work performed in the period 1940-1970 to establish the potential for a direct coal-fired gas turbine, actual operating experience of gas turbines in particulate-laden environments, and recent efforts to evaluate gas turbines for firing with a pressurized fluidized-bed combustor. Results of these studies show clearly that the potential for erosion, corrosion, and deposition exists in gas turbines operated on coal to the extent that the performance and endurance may be substantially reduced. The choice of gas turbine materials strongly influenced the lifetimes of components exposed to coal-derived environments. Bare alloys, such as IN-738, U-700, and X-40, exposed to the hot gas path degraded more rapidly than MCrAlY coatings or claddings which produce protective layers of alumina or chromia. Extremely hard coatings containing high concentration of carbides in a ductile matrix were particularly resistant to erosion. The interaction between corrosion and erosion appears to be synergistic; however, the exact relationships between these processes are still unknown. (ERA citation 05:034063)

EPRI-EM-1185 PC **A07**/MF **A01**
General Electric Co., Wilmington, MA.
Hydrogen Production Using Solid-Polymer-Electrolyte Technology for Water Electrolysis and Hybrid Sulfur Cycle.
J. M. Sedlak, J. H. Russell, A. B. LaConti, D. K. Gupta, and J. F. Austin. Sep 79, 130p

An evaluation was made of the comparative technoeconomics of hydrogen production using the General Electric Company's solid polymer electrolyte technology in two advanced processes: Water Electrolysis and Hybrid Sulfur Cycle Water Decomposition. In water electrolysis, based on the solid polymer electrolyte, only purified water is fed to the cell. The cell voltage is typically 1.65V at 1000 amp/ft exp 2 (ASF), 300 psia and 300 exp 0 F. The sulfur cycle electrolyzer requires a feed stream of water and sulfur dioxide in concentrated sulfuric acid (50-80%). The cell reaction in this case is: 2H sub 2 O + SO sub 2 implies H sub 2 SO sub 4 + H sub 2 . Stoichiometrically formed sulfuric acid must be subsequently decomposed at very high temperature to recover the sulfur dioxide for recycling. An experimental solid polymer electrolyte sulfur cycle electrolyzer projected a voltage of 0.69 volts at 186 ASF in 50% H sub 2 SO exp 4 at 300 psia and 183 exp 0 F. Undesirable sulfur and sulfide byproducts were detected at the cathode. Comparative costs of producing hydrogen by solid polymer electrolyte water electrolysis, and by solid polymer electrolyte sulfur cycle electrolysis, were determined on the basis of performance and economic analysis of plants running at a level of 380 million SCFD. The optimum solid polymer electrolyte water electrolysis plant operates with an overall efficiency of 40.2% at 1000 ASF and a hydrogen gate price of $2.25 per thousand SCF (at 1976 cost levels). A highly optimistic assessment of solid polymer electrolyte sulfur cycle plant indicated an overall efficiency of 42.5% at 400 ASF. The hydrogen gate price (at 1976 cost levels) was 9.8% higher than for solid polymer electrolyte water electrolysis. The principal conclusion of this study is that the solid polymer electrolyte-based hybrid sulfur cycle process shows no technological or economic advantage over existing (solid polymer electrolyte-based) water electrolysis systems for the production of hydrogen. (ERA citation 05:017463)

N81-26554/8 PC **A04**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of Processes for the Production of Solar Grade Silicon from Halides and Alkali Metals, Phase 1 and Phase 2.
Final Report, Oct. 1979 - Feb. 1981.
C. R. Dickson, R. K. Gould, and W. Felder. Mar 81, 66p NASA-CR-164480, DOE/JPL-955491-81/6
Contract JPL-955491
Sponsored in Part by Doe Prepared for JPL.

High temperature reactions of silicon halides with alkali metals for the production of solar grade silicon are described. Product separation and collection processes were evaluated, measure heat release parameters for scaling purposes and effects of reactants and/or products on materials of reactor construction were determined, and preliminary engineering and economic analysis of a scaled up process were made. The feasibility of the basic process to make and collect silicon was demonstrated. The jet impaction/separation process was demonstrated to be a purification process. The rate at which gas phase species from silicon particle precursors, the time required for silane decomposition to produce particles, and the competing rate of growth of silicon seed particles injected into a decomposing silane environment were determined. The extent of silane decomposition as a function of residence time, temperature, and pressure was measured by infrared absorption spectroscopy. A simplistic model is presented to explain the growth of silicon in a decomposing silane enviroment.

PB81-214611 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Water Treatment in Textile Industry.
Monograph rept.
Mar 71, 24p

Textile mills in places like Bombay city are fortunate in getting water supply which is excellent for use in boilers and for wet processing. But mills in most other places have water supply that is unsuitable and needs proper treatment. But a majority of these mills use raw water only for boilers and processing. Various types of water treatment that are recommended, the cost of such treatments and the benefits that accrue are discussed. While this report is mainly intended for member textile mills where boilers are of low pressure, it is generally applicable to other members of ATIRA that manufacture textile chemicals and auxiliaries. Boilers of medium and high pressure are rarely used in textile industry and as such special problems relating to feed water for such boilers are not dealt with here.

PB81-214660 PC **A02**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
Review of the Preparation of Y-Alumina and the Prospects of Production from Local Raw Materials (Oorsig van die Bereiding van Y-Alumina en Vooruitsigte vir die Produksie uit Plaaslike Grondstowwe),
M. G. Howden. Mar 80, 23p CSIR-CENG-313, ISBN-0-7988-1759-3
Text in English and Afrikaans.

The calcination of relatively pure gibbsite (aluminium hydroxide) under controlled conditions produces gamma-alumina of catalytic grade. The properties of the gamma-alumina relevent to its function in catalysis are related to the method of preparation. The primary source of gibbsite for gamma-alumina production is bauxite, but secondary or alternative sources of aluminium can also be used. As substantial high-grade deposits of bauxite have not been found in Southern Africa, industrial scale production of gamma-alumina from that local material is unlikely to be an economic proposition.

PB81-216392 PC **A07**/MF **A01**
Toulouse-3 Univ. (France).
Sub-Optimal Control of Sequences in the Functioning of an Epitasis Reactor in Liquid Phase (Commande sous Optimal des Sequences de Fonctionnement d'un Reacteur d'Epitaxie en Phase Liquide).
Doctoral thesis,
Boutaib Dahhou. 27 Jun 80, 147p ORDER-2364
Text in French.

Among the different techniques for fabricating electronic components such as diffusion, ionic implantation, epitasis (in gaseous phase, liquid phase, through molecular jets), epitasis in liquid phase is a relatively recent development with numerous advantages; equipment easier to operate, larger speeds of depositing layers and greater choice of materials, but it calls for extra attention to the optimal command of the functioning of the thermal reactor. The procedure consists of a progressive cooling of a solution contained in a graphite crucible in the center of the reactor, beginning with a thermal profile in equilibrium. What is needed is a study for the complete automation leading to numerical control by micro-calculator. The epitasis reactor is made up of two concentric quartz cylinders (one transparent; one opaque) placed in the center of a heat insulated casing. Heat is provided by five identical resistors placed along the length. The basic technique for epitasis is the creation of thin, mixed levels (fraction of micron to a few microns) on a monocrystalline substratum serving as a solution, for liquid epitasis. Liquid epitasis is used for achieving levels of arsenic of gallium (GaAs). The process is described in a mathmatical model.

PB81-222275 PC **A15**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Feedstock Characteristics and Preparation for Peat Gasification.
Final rept. for Phase I, 1 Apr-30 Jun 80,
D. V. Punwani, F. Aspinall, and S. M. Lofton. Mar 81, 333p GRI-79/0092
Contract GRI-5014-310-0256
Prepared in cooperation with Dravo Engineers and Constructors, Pittsburgh, PA., and Williams Brothers Engineering Co., Tulsa, OK.

This report describes the work conducted by the Institute of Gas Technology, Dravo Corporation, and Williams Brothers Engineering Company during Phase I of the two-phase program sponsored by the Gas Research Institute. The literature and state-of-the-art of peat resources; peat harvesting, dewatering, and beneficiation technologies; peat gasification feedstock requirements; and the environmental effects of large-scale peat utilization are reviewed. Various estimates of U.S. peat resources are presented. Dry and wet peat harvesting methods commercially used in Russia, Ireland, Finland, Canada, and the U.S. are described, and the economics of peat harvesting are reported. Peat beneficiation (wet-carbonization) processes, mechanical and thermal methods of dewatering peat, and the economics of each are also described. Peat thermal and biological gasification test results are presented, and feedstock requirements (moisture content, particle size) are outlined. Further research needs in all areas of the total system of peat utilization are identified. The results of this study promote the optimistic view that the development of peat as an energy source can be ecologically sound with minimal long-term environmental impacts.

PB81-222812 PC **A12**/MF **A01**
Arizona Univ., Tucson.
Sulfur Pollution Control. Phase I. The Disposal Program (Section 8 and 9).
Open file rept. (Final),
Michael Rieber, Benjamin Okech, and Roger Fuller. Jan 81, 263p BUMINES-OFR-94(3)-81
Contract J0188144
See also Volume 2, PB81-222804 and PB81-222820.
Also available in set of 4 reports PC E99, PB81-222788.

Sulfuric acid production from sulfur-based acid plants and smelters is analyzed. Industry competition, with particular emphasis on voluntary versus abatement acid, is reviewed. Regionally, even though smelter acid is geographically limited, competition is at least moderate. Production costs for both acid plants and smelters are estimated. Due to the byproduct nature of the latter, assigned costs and acceptable producer price are much the lowest. Large-scale users will prefer sulfur-based acid production if the heat value of the reaction can be utilized as a steam credit. Additionally, volunatry acid is a more stable supply source than smelter acid. Voluntary acid output is a reaction to price and demand conditions. Abatement acid production depends on APC implementation and the state of the relevant metals markets. Even if copper, lead, and zinc output remains at current levels, if current EPA regulations are implemented, acid output will approximately double. An output forecast is made based on APC regulations, implementation, and estimated metals production. As a direct competitor to U.S. acid and as indirect competitors to Frasch sulfur, Canadian and rest-of-world acid output is reviewed.

PB81-222820 PC **A06**/MF **A01**
Arizona Univ., Tucson.
Sulfur Pollution Control. Phase II. The Impact of Stack Gas Cleanup on the Sulfur Mining Industry of Texas and Louisiana.
Open file rept. (Final),
Michael Rieber, James M. Barker, and Michael Worrall. Jan 81, 116p BUMINES-OFR-94(4)-81
Contract J0188144
See also Volume 3, PB81-222812.
Also available in set of 4 reports PC E99, PB81-222788.

The impacts of various (reduced) levels of Frasch sulfur production on the States of Texas and Louisiana are analyzed. The analytic time basis is 1979. Industry labor and output characteristics are developed on a company and mine basis. State and local impacts (to the level of independent school districts) are developed on a scenario basis. The measures include income, unemployment, and taxes. Some data are presented on energy and water use.

PB81-868820 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Coal Conversion Processes: The Flash Hydropyrolysis Process. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.

Jul 81, 94p

Citations in this bibliography cover reports on government supported research, development, and implementation of the flash hydropyrolysis coal conversion process. Citations of non governmental studies are provided also. Topics include process experimentation, development, operation, performance, and products as well as technological, environmental, and economic aspects of flash hydropyrolysis. (Contains 73 citations fully indexed and including a title list.)

PB81-872335 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Synthesis of Chemicals from Coal. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 72p

This bibliography contains selected citations concerning feasibility, techniques, processes, and equipment for the synthesis of chemicals from coal for non-fuel use. The major routes to coal chemicals are covered. Attention is also given to properties constants for various coal chemicals. (Contains 68 citations fully indexed and including a title list.)

7B. Inorganic Chemistry

AD-A100 878/8 Not available NTIS
Amherst Coll., MA. Dept. of Physics.
The Concentration and Isotopic Fractionation of Gases Dissolved in Freshwater in Equilibrium with the Atmosphere. 1. Oxygen,
Bruce B. Benson, and Daniel Krause, Jr. 21 Aug 79, 11p
Contract N00014-78-C-0198
Availability: Pub. in Limnology and Oceanography, v25 n4 p662-671 Jul 80. (No copies furnished by DTIC/NTIS).

No abstract available.

CONF-810548-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Determination of B and Li in Nuclear Materials by Secondary-Ion Mass Spectrometry.
R. E. Eby, and W. H. Christie. 1981, 2p
Contract W-7405-ENG-26
29. annual conference on mass spectrometry, Minneapolis, MN, USA, 24 May 1981.

Secondary ion mass spectrometry (SIMS) was used to perform mass and isotopic analysis for B and Li in samples that are not readily amenable to more conventional mass spectrometric techniques (e.g., surface ionization, electron impact, etc.). In this paper three specific applications of SIMS analysis to nuclear materials are discussed: first, the quantitative determination of B and its isotopic composition in borosilicate glasses; second, the determination of the isotopic composition of B and Li in irradiated nuclear-grade aluminum oxide/boron carbide composite pellets, and, lastly, the quantitative and isotopic determination of B and Li in highly radioactive solutions of unknown composition. (ERA citation 06:023961)

GEPP-TIS-569 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Comparison of Semiautomatic and Fully Automatic Water Titrators.
H. W. Middleton. 22 May 81, 17p
Contract AC04-76DP00656

Semiautomatic titration of water using the Karl Fischer single solution conductometric method takes an average of 5 to 15 minutes per test. A new, fully automatic titrator is available that can complete titration at an average rate of three to ten minutes per test. The automatic method of titration is internally standardized (electrically) at all times, eliminating the two hour (average) standardization period required by the semiautomatic method. A digital readout register displays results in micrograms of water, disposing of manual calculations for one gram samples. Identical samples were tested by both the semiautomatic and the automatic methods, resulting in equally accurate calculations of water content. (ERA citation 06:022327)

LBL-9702(Rev.) PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
On-Line Zeeman Atomic-Absorption Spectroscopy for Mercury Analysis in Oil-Shale Gases. Final Report.
D. C. Girvin, and J. P. Fox. Mar 81, 108p
Contract W-7405-ENG-48

This report describes an instrumental technique to continuously measure total mercury in gas streams on a real-time basis. The technique utilizes Zeeman atomic absorption spectroscopy (ZAA) for on-line measurement of mercury in the presence of smoke, organic vapors, and oil mist which are typically present in offgases from oil shale processing plants. The accuracy of the ZAA background correction technique enables analytical measurament of mercury with up to 95% attenuation of the 2537A analytical line by broadband uv absorption. Furnaces with optical absorption tubes of different lengths are used depending upon the mercury concentration. Between 5 and 250 ppB (nanomoles Hg/mole of gas) of mercury in an 18-cm furnace is used. The instrumental response with this furnace is characterized by a detection limit (DL) of 2 ppB, a linear response up to 100 ppB, and a precision of +- 7% or better. In the 50 ppB to 1.6 ppM range, a furnace with a 5-cm optical absorption tube yields a DL of 10 ppB, a linear response up to 800 ppB, and a precision of +- 10% or better. Sample gas flow rates can be varied between 400 and 4000 scc/min for either furnace. 35 figures, 3 tables. (ERA citation 06:023964)

MLM-2833(op) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Systematic Error in Isotopic Analysis of Noble Gas Mixtures.
R. E. Ellefson. 1981, 2p CONF-810548-5
Contract AC04-76DP00053
29. annual conference on mass spectrometry, Minneapolis, MN, USA, 24 May 1981.

Analyses of known standard mixtures of helium-neon, helium-argon, and helium-xenon, show significant biases in measured ratio which change with sample (inlet) pressure. Bias magnitude appears dependent on component partial pressure and not total sample pressure. Quantitative gas analysis assumes a linear relationship between measured ion current, I/sub i/, and partial pressure, PP/sub i/, of a corresponding component in the inlet system: PP/sub i/ = I/sub i//S/sub i/ where S/sub i/ is the sensitivity parameter (assumed constant). For this mass spectrometer, sensitivity is not constant but varies with pressure and is different for each gas. Ion current from a mole fraction, X/sub i/, is related to source pressure, P/sub S/, and ion production factor, K/sub i/, by I/sub i/ = K/sub i/X/sub i/P/sub i/ = K/sub i/(F/sub I//F/sub S/)(1 + (F/sub S//Fsub H/))X/sub i/ P/sub I/. Identifying X/sub i/P/sub I/ as PP/sub i/, sensitivity is given by S/sub i/ = K/sub i/(F/sub I//F/sub s/)(1 + (F/sub S//F/sub H/)). Nonlinear operation can arise from three factors determining sensitivity. Factor K/sub i/, if it varies at all, should depend on total pressure, not partial pressure. Conductance effects of the molecular leak (F/sub I/) and source exit ports (F/sub S/) should have positive slopes for all gases if deviations from molecular flow were significant. Changes in diffusion pumping speed (F/sub H/) by varying the power produce sensitivity changes. Reciprocal of sensitivity changes reflect change in F/sub H/. The variation shown is attributed to changes in F/sub H/ from a cooling effect on pumping fluid with increased gas load. Independent flow of gas components implies that the use of a sensitivity, S/sub i/, appropriate for the partial pressure of the component should minimize systematic errors in ratios: S/sub i/ = S/sub o//sub i/ (1 + S/sub i/ (X/sub i/ P/sub I/)). Applying this model to the data reduced the systematic error. (ERA citation 06:023965)

7C. Organic Chemistry

AD-A101 060/2 PC **A03**/MF **A01**
Rice Univ., Houston, TX. Dept. of Chemistry.
Inorganic Syntheses at High Temperatures and High Pressures with Special Interest in the Preparation of New Fluorine Compounds.
Final rept.,
John L. Margrave. 26 May 81, 44p ARO-15258.18-C
Grant DAAG29-78-G-0155

Reaction studies of elemental fluorine with organic molecules has lead to an understanding of mechanisms of the addition of molecular fluorine to unsaturated carbon-carbon bonds. The sensitivity of the activation energy of molecular fluorine to various molecular properties has been explored through extensive studies of closely related hydrocarbons. The effect of heteroatoms in a variety of hydrocarbons has also been explored. The studies of molecular fluorine reactions with inorganic fluorides has led to the identification of many new unstable fluorine species such as UF5 MUFx where M is an alkali atom and x varies from four to seven. Studies of the interaction of inorganic fluoride species has provided insight into the Lewis base character of transition and main group metal fluorides. The study of interactions and reactions of metal atoms with small Lewis bases has provided an understanding of the important intermediate steps in the reductive chemistry of water and methane with various metals. Novel experimental approaches to the preparation of new metal oxyfluorides and nitrifluoride are also described. (Author)

AD-A101 168/3 PC **A03**/MF **A01**
Bristol Univ. (England). Dept. of Inorganic Chemistry.
Synthesis of New Inorganic and Organometallic Materials.
Final rept. 1 Oct 76-31 Mar 81,
F. Gordon A. Stone. 23 Apr 81, 35p AFOSR-TR-81-0527
Grant AFOSR-76-3102

This report describes several research projects in organometallic chemistry. New methods are reported for preparing heteronuclear metal cluster complexes with osmium-platinum, -nickel, -rhodium, and -iron bonds. Reactions between platinum compounds and nido-carbaboranes yield new cage carbaplatina-boranes. The activation of acetylenes by nickel, molybdenum and platinum has been shown to give many novel organometal structures, and the results emphasize the role of dimetal complexes in reactivity patterns. New fluorocarbon complexes of platinum and molybdenum are also described. (Author)

IS-T-933 PC **A08**/MF **A01**
Ames Lab., IA.
Laser Fluorescence Detection for High-Performance Liquid Chromatography.
M. J. Sepaniak. Feb 81, 155p
Contract W-7405-ENG-82
Thesis.

The excellent sensitivity and selectivity of high performance liquid chromatography (HPLC) with laser fluorescence detection is demonstrated with examples in the biological and environmental fields. The spectral advantages of laser excitation for fluorescence HPLC detection, most notably the high output power of the laser, were discussed and then illustrated for the low picogram level determination of the antitumor drugs adriamycin and daunorubicin in body fluids, and for the characterization of coal-derived asphaltenes. A unique optical fiber-flow cell, designed to be compatible with the characteristics of the laser, provided good stray light rejection and efficient fluorescence signal collection, while maintaining chromatographic efficiency. The complex nature of coal-derived asphaltene samples made their analysis extremely difficult. The sensitivity of laser fluorometric detection permitted small injection quantities. Laser fluorescence, laser two-photon excited fluorescence, and uv absorbance detection were used for this purpose. The asphaltene chromatograms from these detectors were shown to be distinctive. (ERA citation 06:023962)

N81-26260/2 PC **A03**/MF **A01**
Mississippi Univ. for Women, Columbus. Dept. of Physical Sciences.
Monomers for Thermosetting and Toughening Epoxy Resins.
Annual Progress Report.
J. R. Pratt. 1 Jun 81, 37p NASA-CR-164479, APR-2
Grant NSG-1539

Eight glycidyl amines were prepared by alkylating the parent amine with epichlorohydrin to form chlorohydrin, followed by cyclization with aqueous NaOH. Three of these compounds contained propargyl groups with postcuring studies. A procedure for quantitatively estimating the epoxy content of these glycidyl amines was employed for purity determination. Two diamond carbonates and several model propargly compounds were prepared. The synthesis of three new diamines, two which contain propargyloxy groups, and another with a secbutyl group is in progress. These materials are at the dinitro stage ready for the final hydrogenation step. Four aromatic diamines were synthesized for mutagenic testing purposes. One of these compounds rapidly decomposes on exposure to air.

PAT-APPL-6-224 957 PC **A03**/MF **A01**
Department of Health and Human Services, Washington, DC.
4a-Aryl-Decahydrosioquinolines.
Patent Application,
Henry Rapoport, Dwight D. Weller, and Richard D. Gless. Filed 14 Jan 81, 43p PB81-222564
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to the production of 4a-aryldecahydroisoquinolines where the aryl group is selected as 3-methoxy phenyl and intermediates. These compounds are morphine analogs and show utility similar to the known morphine, codeine, and thebaine.

PAT-APPL-6-247 684 PC **A02**/MF **A01**
Department of Commerce, Washington, DC.
Method for Producing Carbocyclic Compounds.
Patent Application,
Richard I. Martinez, and John T. Herron. Filed 26 Mar 81, 21p PB81-222580
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is provided for producing a carbocyclic compound by contacting an organic compound containing a 4-8 membered cyclic sulfide with ozone, in the vapor phase, and recovering a product containing a 3-7 membered carbocyclic ring.

PATENT-4 265 945 Not available NTIS
Department of Agriculture, Washington, DC.
Quaternary Ureidomethyl Phosphonium Salts.
Patent,
Arlen W. Frank. Filed 29 Nov 79, patented 5 May 81, 10p PB81-228694, PAT-APPL-6-098 459
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Novel quarternary ureidomethyl phosphonium salts having the general formula are prepared by condensing a urea having the formula RNHC(0)NR(1)R(2) with a quaternary hydroxymethyl phosphonium salt having the formula (HOCH2)4P(+1)X(-1) -in a molar ratio of at least 2:1. The products, which are characterized by the absence of residual hydroxymethyl groups, are useful as finishing agents for imparting flame retardant properties to cotton fabrics.

PB81-219362 PC **A02**/MF **A01**
Bio-Metric Systems, Inc., Minneapolis, MN.
Affinity Crosslinking for Enzyme Technology.
Final rept. 1 Oct 79-31 Mar 80,
Patrick E. Guire. Mar 80, 13p NSF/RA-800533
Grant NSF-DAR79-17512

The objective of this project was to develop a new class of stepwise affinity crosslinking reagents that will covalently immobilize and stabilize enzymes and other binding proteins selectively from crude mixtures. Tri- and poly-functional stepwise crosslinking reagents that contain both photoreactive and ligand groups were synthesized. The photoaffinity carrier materials prepared from these were selected to be hydrophilic and nonionic in order to reduce the nonspecific binding of proteings and thereby increase their specificity in the photochemical immobilization step. Agarose derivatives were prepared with homocysteine spacer arms containing the photoreactive azidonitrophenyl group on the amino nitrogen and the ligand dinitrophenyl group (N-DNP-mercaptoethylamine) linked reversibly to the sulfhydryl group. These photoaffinity carrier derivatives were used to preferentially immobilize covalently specific antibody and albumin binding proteins from crude antiserum. An immobilization yield of approximately 50 percent was demonstrated. The technological feasibility of this approach is experimentally indicated.

7D. Physical Chemistry

AD-A100 587/5 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Chemical and Biodegradation Processes Group.
Ultratrace Speciation and Biogenesis of Methyltin Transport Species in Estuarine Waters.
Interim technical rept.,
F. E. Brinckman, J. A. Jackson, W. R. Blair, G. J. Olson, and W. P. Iverson. 1981, 40p Rept no. NBS-5610406-TR-5
Contract N00014-81-F-0013

Environmental tin, widely dispersed at low concentrations in waters, sediments, and biota, is now perceived to be a bioactive element susceptible to methylation and even hydridization by marine bacteria. Nonetheless, the redox cycle of tin in natural waters is poorly understood and recent advances in tin-specific molecular characterization fail to speciate Sn(II) and Sn(IV) reliably. On the other hand, such rapid developments in speciation methodology now permit growing numbers of studies of organotin distributions in aquatic systems, raising the question of the natural biogeochemical flux of methylstannanes in relation to increased anthropogenic organotin influx from industry and shipping. New methods for direct speciation of aquated or involatile organotins by liquid chromatography are compared with advances in purge-and-trap sampling of volatile or hydrophobic organotins speciated by gas chromatography. The work in our laboratory indicates that effective models for estuarine formation and transport may ultimately be developed, that the basic roadblocks to progress stem from inadequate descriptive aqueous organometallic chemistry and knowledge of critical kinetic parameters for the lifetimes of key organotin species in sea water. (Author)

AD-A100 604/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Effect of Activation Energy on Tubular Reactor Multiplicity.
Technical summary rept.,
Robert F. Heinemann, and Aubrey B. Poore. Apr 81, 15p Rept no. MRC-TSR-2201
Contract DAAG29-80-C-0041

The effect of activation energy on the steady state solutions exhibited by the nonadiabatic tubular reactor is investigated by applying numerical bifurcation techniques to the model equations. As the activation energy is increased, the solution branch becomes more complex and finally evolves into a multiplicity pattern with regions of one, three, five and seven solutions. Only the states of lowest and highest temperature are found to be stable. This work confirms recent results using large activation energy asymptotics and links these results to previous numerical studies of reactor multiplicity employing low to moderate values of activation energy. (Author)

AD-A100 616/2 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Nonlinear Volterra Integrodifferential Equation Describing the Stretching of Polymeric Liquids.
Technical summary rept.,
P. Markowich, and M. Renardy. May 81, 63p
Rept no. MRC-TSR-2213
Contract DAAG29-80-C-0041, Grant NSF-MCS79-27062

We study a model equation for the elongation of filaments or sheets of Polymeric liquids under the influence of a force applied to the ends. Mathematically this equation has the form of a nonlinear Volterra integrodifferential equation with the kernel given by a finite sum of exponentials. The unknown function denotes the length of the filament or, respectively, the thickness of the sheet. We study the equation both analytically and numerically. The force is assumed to converge to zero exponentially as t approaches minus infinity and to vanish identically after a finite time t sub 0. It is shown that under this condition there is a unique solution which approaches a given limit as t approaches minus infinity; moreover, the solution also has a limit as t approaches plus infinity. A numerical scheme is analyzed and convergence uniformly in t is established. Particular attention is paid to the dependence of solutions on a parameter mu, which corresponds to a Newtonian contribution to the viscosity. It is proved that solutions converge uniformly in t as mu approaches, and that the convergence of the numerical scheme is also uniform in mu. (Author)

AD-A100 619/6 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
The Physics and the Chemistry of ETWAC Code (An Early Time wet Air Chemistry Code for Disturbed Air Conductivity Calculations).
Memorandum rept.,
A. W. Ali. 8 Jun 81, 24p Rept no. NRL-MR-4537
ARPA Order-3718

The physics and the chemistry of dry and wet air disturbed by an electron beam, is described. The pertinent reactions controlling the deionization and hence the air conductivity is presented. (Author)

AD-A100 649/3 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
Microdielectrometry.
Technical rept. no. 3, Apr 80-Jun 81,
Stephen D. Senturia, Norman F. Sheppard, Steven L. Garverick, Huan L. Lee, and David R. Day. 8 Jun 81, 28p
Contract N00014-78-C-0591, Grant NSF-DMR78-24185

The low-frequency dielectric properties of resins provide a useful tool for characterization both of the curing process and of fully cured material. We have used integrated circuit technology to develop a miniaturized dielectric probe that combines small size with built-in amplification to achieve sensitivity at frequencies as low as 1 Hz. The device combines a planar interdigitated electrode structure with a pair of matched field-effect transistors. The microdielectrometer 'chip' can be implanted in a specimen, or a small sample of material (a few milligrams) can be placed on the active area of the device. When combined with an off-chip electronic feedback system, the device can be used to measure the complex dielectric constant of the sample material either as it cures, or after cure. The device is capable of operating at temperatures up to 200 C, making it useful for a wide variety of curing and post-cure studies. Device calibration is based on a two dimensional computer model which has been experimentally confirmed for a variety of control samples. Several typical applications are illustrated by experiments, and the use of the data to follow changes in the dominant low-frequency dielectric relaxation during the cure of a model epoxy resin system are presented. (Author)

AD-A100 756/6 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Macromolecular Science.
The Structure of an Aminosilane Coupling Agent in Aqueous Solutions and Partially Cured Solids.
Technical rept.,

Hatsuo Ishida, Somsak Naviroj, Sukant K. Tripathy, John J. Fitzgerald, and Jack L. Koenig.
4 Jun 81, 46p Rept no. TR-1
Contract N00014-80-C-0533

The molecular structures of partially cured polyaminopropylsilsesquioxane and aminopropyltriethoxysilane in water have been studies using Fourier transform infrared, laser Raman and quasielastic laser light scattering spectroscopy. We propose a multiple hydrogen-bonded structure for the intramolecularly interacting amine and silanol groups using isotope exchange experiment and conformational energy calculations. Conformational restrictions are rather low for the proposed structure thus suitable for the partially cured solid where there are slight perturbations by the surrounding amine and silanol groups. The O....N distance was experimentally determined to be in the range 2.70 - 2.67A and estimated theoretically as 2.49 - 2.45A. The aminosilane in very dilute solution was found to be mostly monomeric. The isolated monomer-oligomer transition lies around 0.15% by weight and this transition influences the amount of silane uptake by glass fibers. It is also proposed that this phenomenon may be general for surface treatments by silane coupling agents. Hydrolyzed aminosilane oligomers exist in part as submicron aggregates which can be broken up by the addition of an alcohol. The neutralized aminosilane hydrolyzed very slowly although it dissolved into water instantaneously. A micelle formation was also proposed. (Author)

AD-A100 856/4 Not available NTIS
Duke Univ. Medical Center, Durham, NC. Dept. of Biochemistry.
Cyanide Catalyzes the Oxidation of Alpha-Hydroxyaldehydes and Related Compounds: Monitored as the Reduction of Dioxygen, Cytochrome c, and Nitroblue Tetrazolium,
Philmore Robertson, Jr., Sharon E. Fridovich, Hara P. Misra, and Irwin Fridovich. 9 Jul 80, 9p
ARO-15319.23-L
Grants DAAG29-78-G-0088, PHS-GM-10287
Availability: Pub. in Archives of Biochemistry and Biophysics, v207 n2 p282-289 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 857/2 PC **A02**/MF **A01**
North Carolina State Univ., Raleigh. Dept. of Engineering Research.
Diffusion and Creep in Niobium Carbide as a Function of Temperature and Carbon Content.
Final rept. 1 Mar 75-30 Mar 81,
Robert F. Davis. 5 Jun 81, 20p ARO-12487.7-MS
Grant DAAG29-75-G-0113

The transition metal carbides possess a combination of some of the highest melting points, hardness values and mechanical strengths of any known materials. The contemporary interest in these materials in structural and cladding applications at temperatures where most materials would be molten or would seriously degrade made it imperative that the high temperature diffusion and deformation processes and their relationship to each other be understood. Thus, the principal thrusts of this ARO-sponsored program have been the conduct of self-diffusion studies of 14C and 95Nb in single crystals of NbC0.868 NbC0.834 and NbC0.766 and constant stress compressive creep research on the same materials. Extensive characterization of these materials has also been performed.

AD-A100 859/8 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Stochastic Photolysis: A New Method for Measuring Rates of Photosensitive Reactions.
Interim technical rept.,
G. R. Haugen, G. M. Hieftje, L. L. Steinmetz, and R. E. Russo. 25 Jun 81, 33p Rept nos. TR-38, 46
Contract N00014-76-C-0838

A new method is introduced for the measurement of photochemical or photobiological reaction rates. Based on linear response theory, the method uses a randomly modulated light source rather than a pulsed one, and employs cross-correlation analysis to extract the desired kinetic information. In operation, a randomly varying light source illuminates the reaction of interest, and the resulting fluctuations in reactant (or product) concentrations are monitored. Mathematical or instrumental cross correlation of the light source variations with those in component concentration then produces the familiar kinetic decay curve. Because the new method produces only minute concentration fluctuations, it can measure reaction rates very near equilibrium; moreover, equilibrium position can be shifted by superimposing on the fluctuating light intensity a dc level. Also, because cross correlation is employed, the method enjoys high signal-to-noise ratios. In the present study, the utility and practicability of the new technique are demonstrated through examination of the recombination kinetics of photolytically generated iodine atoms. (Author)

AD-A100 863/0 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Triply Differential Studies of Atomic and Molecular Photoionization Using Synchrotron Radiation.
Summary questionnaire 1 Jun 80-30 Sep 81,
J. L. Dehmer, Albert C. Parr, and Roger Stockbauer. 6 Jul 81, 9p
Contract N00014-81-F-0005

Basic studies of the dynamics and spectroscopy of atomic and molecular photoionization have been carried out using three experimental probes. The first and most extensively used experimental approach involves triply differential (differential in incident wavelength, electron energy, and ejection angle) photoelectron measurements using synchrotron radiation. Measurements were conducted in the vacuum ultraviolet wavelength range up to h(nu) about 35 eV on several atomic and molecular species, e.g., Ar, Kr, Xe, H2, N2, O2, CO, SO2, C2H2, C2N2, HCN, CH3CN, BF3, and SF6. Photoelectron branching ratios and angular distributions were obtained for all accessible states. A major emphasis of this work involved the initial exploration of novel effects of autoionization and shape resonances on alternative vibrational ionization channels. The second experimental approach entailed measuring the polarization of fluorescence following production of excited molecular ions by photoionization. This was also a novel experiment, allowing the direct measurement of the alignment of molecules ions produced by photoionization and, simultaneously, the branching ratios for degenerate photoelectron channels. The third experimental approach was, again, a novel experiment, and involved determining the photoelectron spectrum of an atomic cluster (Xe3) in a mixture of clusters formed in a supersonic expansion by the technique of photoion-photoelectron coincidence. (Author)

AD-A100 879/6 Not available NTIS
Amherst Coll., MA. Dept. of Physics.
The Solubility and Isotopic Fractionation of Gases in Dilute Aqueous Solution. I. Oxygen,
Bruce B. Benson, Daniel Krause, Jr., and Mark A. Peterson. 23 Feb 79, 37p
Contract N00014-78-C-0198
Availability: Pub. in Jnl. of Solution Chemistry, v8 n9 p655-690 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 909/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Radiometric Observations of the 752.033-GHz Rotational Absorption Line of H20 from a Laboratory Jet.
Journal article,
Gerald F. Dionne, Tse-Sen Chang, James F. Fitzgerald, Marvin M. Litvak, and Harold R. Fetterman. 26 Apr 80, 16p JA-5100, ESD-TR-81-31
Contract F19628-80-C-0002
Pub. in International Jnl. of Infrared and Millimeter Waves, v1 n4 p581-595 1980.

No abstract available.

AD-A100 978/6 PC **A03**/MF **A01**
Mathematical Sciences Northwest, Inc., Bellevue, WA.
Mjollnir Rotational Line Scan Diagnostics.
Final rept.,
E. L. Klosterman, and P. E. Cassady. 19 May 81, 50p MSNW-1157, AFOSR-TR-81-0533
Contract F49620-80-C-0066

The rotational line scan diagnostic technique described in this report can be used to derive the time history of the rotational temperature, the ground state DF population and the population in the first excited state during the output pulse of an atmospheric pressure DF laser from measurements of gain/absorption on three adjacent rotational lines in the 1-0 vibrational band. A description of the theoretical foundations of this technique is given together with sample calculations for typical pulsed DF laser conditions. An experimental system using a low pressure cw probe laser has been assembled for application on the AFWK Mjollnir laser. The design, assembly, alignment and operation of this diagnostic system are described in detail. Within operational limitations imposed by the probe laser, the performance of the diagnostic system has been verified using a pulsed gain cell. (Author)

AD-A101 010/7 PC **A04**/MF **A01**
Litton Systems, Inc., Woodland Hills, CA. Guidance and Control Systems Div.
Nuclear Moment Alignment, Relaxation and Detection Mechanisms.
Annual rept. Feb 80-Jan 81,
Tae M. Kwon. Feb 81, 71p G/CSD/404577, AFOSR-TR-81-0503
Contract F49620-77-C-0047

The reported physics research is part of an overall program to develop a nuclear magnetic resonance gyro that makes use of an optically pumped alkali metal vapor both to align the magnetic moments of the noble gas nuclei and to detect the weak magnetic fields that are generated by these precessing nuclear moments. Theoretical and experimental investigations are reported on the relaxation of polarized nuclear spins of Xe131 through the interaction of the nuclear quadrupole moment with the electric field gradient. The field gradient arises from deformation of the otherwise spherical electronic shell of the zenon atom.

AD-A101 026/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Orientational and Electronic Contributions to the Third-Order Susceptibilities of Cryogenic Liquids.
Journal article,
Helge Kildal, and Steven R. Brueck. 14 May 80, 9p JA-5123, ESD-TR-81-37
Contract F19628-80-C-0002
Pub. in Jnl. of Chemical Physics, v73 n10 p4951-4958, 15 Nov 80.

No abstract available.

AD-A101 035/4 PC **A02**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Research Directorate.
Laser Photochemical Reactions of Boron Compounds.
Technical rept.,
J. K. McDonald, L. C. Warren, and J. A. Merritt. Mar 81, 20p DRSMI/RR-81-2-TR, AD-E950 143

Some laser-induced reactions of BF3, BCl3 or B(CH3)3 with NF3, N2F4 or C2H4 have been studied. These reactions were initiated by the multiphoton absorption of the infrared radiation from a CW CO2 laser. In addition to numerous gaseous products, infrared spectra of solids, that have been identified as belonging to BF4 and BN, were observed. When possible, visible emission, which accompanied some of the reaction, was photographed. Analysis has shown it to be due, in part, to C2 and CN when carbon was present and a continuum for a BCl3 and N2 mixture. (Author)

AD-A101 040/4 PC **A04**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Structural and Kinetic Properties of Graphite Intercalation Compounds.
Annual rept. 1 Mar 80-28 Feb 81,
D. D. L. Chung. 18 Jun 81, 63p AFOSR-TR-81-0532

Grant AFOSR-78-3536

The processes of the intercalation of graphite, the desorption of intercalated graphite, and the exfoliation of intercalated graphite have been studied by using x-ray diffraction, x-ray absorption, optical microscopy, thermogravimetry, dilatometry and acoustic emission measurement. Emphasis was given to the structural changes which occur during these processes and the kinetics of these processes. For bromine intercalation, it was found that intercalation does not involve a progressive change in stage, although the final stage (n) may be dominated by the next higher stage (n+1) during the early part of the intercalation process. Furthermore, it was confirmed that the final stage increases with increasing temperature for the same intercalate activity, and that the rate of interaction increases with increasing temperature. On the other hand, desorption was found to involve a progressive increase of stage. Moreover, desorption was found to begin at the edge of the sample, resulting in a difference in stage between the edge and central regions of the c-face; the concentration gradient was found to increase with decreasing stage. The amount of expansion observed on exfoliation was found to be determined principally by the parent stage formed during intercalation; the higher is the stage of the parent, the larger is the amount of expansion.

AD-A101 045/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
Low Lying Electronic States of CeO,
C. Linton, Michael Dulick, R. W. Field, P. Carette, and R. F. Barrow. 28 Jul 80, 4p AFGL-TR-81-0177
Contract F19628-C-77-0061
Pub. in Jnl. of Chemical Physics, v74 n1 p189-191, 1 Jan 81.

No abstract available.

AD-A101 046/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
On the Hyperfine Structure of the o - o Band in the Pro XVII System,
Michael Dulick, Robert W. Field, and J Cl. Beaufils. 3 May 79, 2p AFGL-TR-81-0175
Contract F19628-77-C-0061
Pub. in Jnl. of Molecular Spectroscopy, v78 p333-334 1979.

No abstract available.

AD-A101 047/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Laser Spectroscopy of CeO: Fluorescence of the C1-X1 and D3-X1 Systems,
C. Linton, Michael Dulick, and R. W. Field. 17 Jan 79, 10p AFGL-TR-81-0178
Contract F19628-77-C-0061, Grant NSF-CHE75-1949
Pub. in Jnl. of Molecular Spectroscopy, v78 p428-436 1979.

No abstract available.

AD-A101 050/3 Not available NTIS
Georgia State Univ., Atlanta.
Branching Ratios of Hg 5d and Cd 4d: Dirac-Fock Calculations,
B. R. Tambe, Warren Ong, and Steven T. Manson. 27 Jun 80, 6p ARO-14560.11-P
Grant DAAG29-77-G-0068
Availability: Pub. in Physical Review A, v23 n2 p799-803 Feb 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A101 051/1 Not available NTIS
Georgia State Univ., Atlanta.
Calculation of Double Differential Cross Section for Fast Ion and Electron Impact Ionization of Atoms,
Steven T. Manson. 1981, 6p ARO-14560.9-P
Grant DAAG29-77-G-0068
Availability: Pub. in IEEE Transactions on Nuclear Science, vNS-28 n2 p1084-1088 Apr 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A101 157/6 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Structure and Ion Transport in Polymer-Salt Complexes.
Interim technical rept.,
D. F. Shriver, B. L. Papke, M. A. Ratner, T. Wong, and M. Brodwin. May 81, 7p
Contract N00014-80-C-0532

The literature on polymer electrolytes is reviewed with emphasis on structural models, conductivity response in the microwave region, and the factors which influence both polymer-salt complex formation and ion transport in polyethers. (Author)

AD-A101 161/8 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Ion-Pairing in Polyether Solid Electrolytes and Its Influence on Ion Transport.
Interim technical rept.,
B. L. Papke, R. Dupon, M. A. Ratner, and D. F. Shriver. May 81, 5p
Contract N00014-80-C-0532, Grant NSF-DMR76-80847

Vibrational spectroscopic and conductivity data are presented for complexes of NaBF4 and NaBH4 with poly(ethylene oxide). These studies indicate that extensive contact ion pairing occurs in the NaBH4 complex but not in the NaBF4 complex. As a result the ionic conductivity is considerably lower in the NaBH4 complex, due to trapping of the mobile sodium cations by the anion. The effect of salt stoichiometry on the conductivity behavior is also reported. (Author)

AD-A101 181/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Formation of the XeBr Exciplex by Xe-Br2 (D') Collisions.
Journal article,
Daniel J. Ehrlich, and Richard M. Osgood. 27 Mar 80, 9p JA-5076, ESD-TR-81-26
Contract F19628-80-C-0002
Pub. in Jnl. of Chemical Physics, v73 n7 p3038-3045, 1 Oct 80.

No abstract available.

AD-A101 184/0 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Collisional Excitation of H2O and CO2 by O(3P) Atoms.
Final technical rept. 1 Oct 79-11 Sep 80,
Rodney J. Bartlett, and Michael J. Redmon. Feb 81, 108p AFRPL-TR-81-27
Contract F04611-79-C-0024

Theoretical calculations of the molecular excitation cross sections for: O(3P) + H2O(1A1) and O(3P) + CO2 (1 sigma g+) collisions were made as a function of velocity over the range 2-10km/sec. Potential surfaces for these reactions were computed using the many body perturbation technique. Trajectory calculations were performed with a Monte Carlo quasi-classical trajectory technique. To obtain an accurate analytical fit of the potential surface a many body force field was employed. Also to obtain good action angle variables a technique was developed to perform final state analysis. The results for H2O are insensitive to within a factor of 2 for substantial changes in the fit parameters. This provides a measureable degree of confidence of the predicted results. Representative values for H2O (001) + 0 are 2.0 x 10 to the minus 7th power sq cm at 4km/sec and 2.0 x 10 to the minus 16th power at 6km/sec. The results for CO2 + 0 are not as reliable due to the use of a simplier fit of the surface. The results for C02 show that excitation of NN'I states is more probable by up to two orders of magnitude than direct excitation of the 001 state. If radiation from the 001 state is observed then a multiple collision environment probably exists. Representative values for CO2 (001) + 0 are 3.0 x 10 to the minus 19th power at 6km/sec and 2.5 x 10 to the minus 18th power at 8km/sec.

ANL-80-126 PC **A14**/MF **A01**
Argonne National Lab., IL.
Workshop on Foundations of the Relativistic Theory of Atomic Structure.
Mar 81, 310p CONF-801255-
Contract W-31-109-ENG-38
Workshop on foundations of the relativistic theory of atomic structure, Argonne, IL, USA, 4 Dec 1980.

The conference is an attempt to gather state-of-the-art information to understand the theory of relativistic atomic structure beyond the framework of the original Dirac theory. Abstracts of twenty articles from the conference were prepared separately for the data base. (ERA citation 06:022748)

BNL-29519 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Real Time Mass Flux Measurements of Gas-Solid Suspensions at Low Velocities.
J. H. Saunders, B. T. Chao, and S. L. Soo. 1981, 13p CONF-810581-1
Contract AC02-76CH00016
Powder and bulk solids conference, Chicago, IL, USA, 12 May 1981.

In previous work, measurement of the particulate mass flux was made based upon a novel electrostatic technique. A small conducting wire sensor was inserted in the flow and as each particle hit the sensor an individual pulse of current was identified. Through suitable electronic circuitry, the number of pulses in a given time were counted. This was a direct measure of the number of particle-probe collisions which was related to local particle mass flow. The technique is currently limited to monodisperse suspensions. A primary advantage of the impact counter system is that the output does not depend upon the magnitude of the actual charge transfer. As long as the pulses are sufficiently above the noise level, variations in charge transfer will not affect the measurement. For the current work, the technique was applied to vertical gas-solid flow where the fluid velocity was slightly above the particle terminal velocity. Under these conditions a sufficient signal to noise ratio was not found. The Cheng-Soo charge transfer theory indicated that the low particle-sensor impact velocity was responsible. The probe system was then modified by extracting a particulate sample isokinetically and accelerating the particles to a sufficient velocity by an area reduction in the sampling tube. With this technique the signal to noise ratio was about 12 to 1. Mass flux results are shown to compare favorably with filter collection and weighing. (ERA citation 06:024031)

DE81023032 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Laser-Induced Chemical Reactions.
A. E. Orel. Dec 80, 126p LBL-12089
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

A classical model for the interaction of laser radiation with a molecular system is derived. This model is used to study the enhancement of a chemical reaction via a collision induced absorption. It was found that an infrared laser will in general enhance the rate of a chemical reaction, even if the reactants are infrared inactive. Results for an illustrative analytically solvable model are presented, as well as results from classical trajectory studies on a number of systems. The collision induced absorption spectrum in these systems can be written as the Fourier transform of a particular dipole correlation function. This is used to obtain the collision induced absorption spectrum for a state-selected, mono-energetic reactive collision system. Examples treated are a one-dimensional barrier problem, reactive and nonreactive collisions of H + H sub 2 , and a modified H + H sub 2 potential energy surface which leads to a collision intermediate. An extension of the classical model to treat laser-induced electronically nonadiabatic collision processes is constructed. The model treats all degrees of freedom, molecular, electronic and radiation, in a dynamically consistent framework within classical mechanics. Application is made to several systems. Several interesting phenomena are discovered including a Franck-Condon-like effect causing maxima in the reaction probability at energies much below the classical threshold, laser de-enhancement of chemical reactions and an isotope effect. In order to assess the validity of the classical model for electronically nonadiabatic process (without a laser field), a model problem involving energy transfer in a collinear atom-diatom

system is studied, and the results compared to the available quantum mechanical calculation. The calculations are in qualitative agreement. (ERA citation 06:024448)

DE81023755 PC **A08**/MF **A01**
Ames Lab., IA.
Manual for the Fourier Data Analysis Program, Code: FA1, Version/1.2/, Operating System: RT-11. Volume 1 and Volume II.
P. D. Murphy. May 81, 168p IS-4769
Contract W-7405-ENG-82
Microfiche only after original copies are exhausted.

This report contains the manual for the Fourier Data Analysis Program FA1, Version/1.2/. This interactive computer program was developed to perform spectral analyses with special applications to nuclear magnetic resonance (NMR). The program is designed to run on digital PDP-11 computers under the RT-11 monitor. Tasks performed by the program include: second-order least-squares baseline corrections; zero-order and linear phase adjustments; broadband spectral compensations; convolution of discrete spectra; addition and subtraction of spectra; incremental plots; Fourier transforms; resolution and sensitivity enhancements; data normalizations; polar/rectangular conversions; data smoothing; calculations of areas, first and second moments; calculation of segments of large fourier transforms; and spectrum synthesis. This report contains two volumes. The first volume describes the program and shows illustrations and examples of FA1 command usage. The second volume contains an in-depth discussion of FA1 commands. (ERA citation 06:024824)

DE81024014 PC **A08**/MF **A01**
Los Alamos National Lab., NM.
Chemistry-Nuclear Chemistry Division. Progress Report, October 1979-September 1980.
R. R. Ryan. May 81, 164p LA-8717-PR
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

This report presents the research and development programs pursued by the Chemistry-Nuclear Chemistry Division of the Los Alamos National Laboratory. Topics covered include advanced analytical methods, atmospheric chemistry and transport, biochemistry, biomedical research, element migration and fixation, inorganic chemistry, isotope separation and analysis, atomic and molecular collisions, molecular spectroscopy, muonic x rays, nuclear cosmochemistry, nuclear structure and reactions, radiochemical separations, theoretical chemistry, and unclassified weapons research. (ERA citation 06:023996)

DE81024989 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Study of Ring and Ring-Disk Electrodes.
P. E. Pierini. May 81, 117p LBL-12776
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

Rotating ring and ring-disk electrodes were modeled. The primary, secondary, and below-the-limiting current distributions for ring electrodes were computed. The ring-disk system was modeled for secondary and below-the-limiting current distributions. Mass transfer measurements in laminar, transition, and turbulent flows were made for thin rotating rings. The effect of cell walls on the potential distribution of disk electrodes was computed. (ERA citation 06:023987)

DOE/DP/40017-T1 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Physics.
Theoretical Investigation and Calculation of Certain Atomic and Molecular Processes Important in the Formation and Destruction of Excited Stable Gas Molecules (Or Excimers). Final Report, October 1, 1978-November 30, 1979.
M. R. Flannery. 1979, 8p
Contract AS05-76DP40017

Progress is reported in the following areas: (a) atomic and molecular collision processes in rare-gas-halide lasers and rare-gas excimer lasers; (b) semiquantal treatment of excited-atom-excited-atom collisions; (c) systematic trends in the inelastic cross sections and form factors for nl implies n'l' direct collisional transitions; (d) multistate semiclassical orbital treatment of Li exp + -H sub 2 and H exp + -H sub 2 collisions; and (e) elastic scattering and rotational excitation in ion-molecule collisions (Li exp + -H sub 2 and H exp + -H sub 2 collisions). (ERA citation 06:022771)

DOE/ER/04974-T1 PC **A02**/MF **A01**
Brown Univ., Providence, RI.
Interactions of Molecules with Surfaces. Progress Report, 1 May 1980-31 March 1981.
E. F. Greene. Mar 81, 11p COO-4974-3
Contract AS02-78ER04974

An improved apparatus has been designed and constructed to measure the angular distribution of rare gas atoms scattered elastically, or nearly elastically, from the surfaces of crystals. The yields of ions produced when neutral beams of Li, Na, K and Tl hit surfaces of Si (III) or Pt are recorded as they vary with the temperatures of the surfaces. The ions are identified by mass spectroscopy and the surface cleanliness monitored by Auger measurements. Reactions can be activated when fast beams of molecules hit a stationary surface. Above a threshold in kinetic energy beams of W(CO) sub 6 leave a nonvolatile deposit of decomposition products on a glass surface. Raman spectra of these deposits show bands in the carbonyl and metal-carbon stretching regions. Similar experiments with beams of paraldehyde show it decomposes to acetaldehyde in one energetic collision. (ERA citation 06:022772)

DOE/ER/10749-1 PC **A06**/MF **A01**
Arkansas Univ., Fayetteville. Dept. of Physics.
Theoretical Study of Electron Capture in Ion-Ion and Ion-Atom Collisions. Progress Report, September 1, 1980-April 30, 1981.
M. Lieber, and F. T. Chan. Apr 81, 104p
Contract AS05-80ER10749

The eikonal approximation has been recently shown to be of significant utility in the study of electron capture cross sections for energetic ion-atom collisions. The method generally gives much better agreement with available experimental data than does the simple OBK approximation without substantially increasing the difficulty of computation. In the present work, the total cross section is computed for electron capture into an arbitrary nl subshell of H exp + , C exp +6 , O exp +8 , and Fe exp +24 ions from ground state hydrogen atoms, at energies of 40 to 200 keV/nuclear (30 to 100 keV in the H exp + case). These species were selected because of their importance in fusion studies. Interesting variations with l were obtained. Cross sections for capture into an arbitrary final n-shell, or into all final bound states were also obtained. An analytical closed form expression is derived for electron capture from an arbitrary initial nlm state to an arbitrary final n'l'm' state of a hydrogenic target. Numerical results are presented for all n' = 2,3 final states in hydrogen, which may be subjected to experimental test in the near future. Extension of the eikonal method to multielectron targets was studied. There are ambiguities in the method requiring further analysis. Agreement with experimental data is nevertheless satisfactory, but the high energy results are suspect. (ERA citation 06:022773)

DOE/EV/72005-T2 PC **A02**/MF **A01**
California Univ., Berkeley. Dept. of Physics.
Measurement of Pair Interactions in Neodymium Ethyl Sulfate.
A. R. King, and C. D. Jeffries. Aug 70, 23p
Contract AT03-76EV72005

The EPR spectrum of single ions of exp 143 Nd in a crystal of Neodymium Ethyl Sulfate, predominantly of isotope exp 142 Nd, was observed under condition of very high Boltzmann factor, i.e., high fields and low temperatures. It was found that the interactions with neighboring ions displaced the hyperfine lines from uniform spacing, and that by measuring the deviation it was possible to find the nearest neighbor interaction. The departure from a purely magnetic dipolar interaction is smaller than previous measurements would indicate. It was found that EPR resonance at large values of H/T in magnetically concentrated crystals can yield accurate values of spin-spin interactions. (ERA citation 06:022774)

LA-UR-81-1157 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Self-Focusing in SF sub 6.
J. R. Ackerhalt, and H. W. Galbraith. 1981, 7p
CONF-810429-15
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

It is shown by explicit calculation of previously published quasicontinuum model that the molecular susceptibility rapidly approaches zero as higher excited states of the molecule become populated. Hence the overtones of the nu sub 3 -pumped mode are totally responsible for the self focusing effects in SF sub 6 . The nu sub 3 ladder contribution to the susceptibility is calculated. The vibrational model is a classical triply degenerate anharmonic oscillator in the Cartesian basis with the anharmonicity parameters chosen to be consistent with the latest spectroscopic analysis of the 3 nu sub 3 overtone spectrum. The rotational structure is represented by a distribution of these oscillators where the distribution is chosen to correspond to the spectrum of the nu sub 3 fundamental. Good agreement is found with the 300 exp 0 in self-focusing data of Nowak and Ham at CO sub 2 P(28), P(20) and P(10) in SF sub 6 . (ERA citation 06:022775)

LA-UR-81-1526 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Laser-Induced Breakdown Spectroscopy: Detecting Sodium and Potassium in Coal Gasifiers.
T. R. Loree, and L. J. Radziemski. 1981, 30p
CONF-810607-2
Contract W-7405-ENG-36
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.

The goal of this research program is the eventual development of a real-time monitor of trace quantities of elements present in hostile environments such as coal gasifier process streams. With laser-induced breakdown spectroscopy (LIBS), we have demonstrated the ability to probe a real process stream and achieve appropriate levels of detectability for sodium and potassium with real-time response. TRELIBS (time-resolved LIBS) will extend the capabilities of this form of emission spectroscopy to both better sensitivity and higher pressure environments. The difficult problem of quantification is being investigated. (ERA citation 06:022329)

LBL-12054 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Relative Performances of Several Scientific Computers for a Liquid Molecular Dynamics Simulation.
D. M. Ceperley. Aug 80, 11p CONF-800814-33
Contract W-7405-ENG-48
180. American Chemical Society meeting/2. chemical congress of the North American Continent, Las Vegas, NV, USA, 24 Aug 1980.

Some of the computational characteristics of simulations and the author's experience in using his standard simulation program called CLAMPS on several scientific computers are discussed. CLAMPS is capable of performing Metropolis Monte Carlo and Molecular Dynamics simulations of arbitrary mixtures of single atoms. The computational characteristics of simulations and what makes a good simulation computer are also summarized. (ERA citation 06:023975)

LBL-12523 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Laser Photoacoustic Spectroscopy of High Vibrational Overtones.
J. S. Wong, and C. B. Moore. 1981, 3p CONF-810630-5
Contract W-7405-ENG-48
International photoacoustic spectroscopy conference, Berkeley, CA, USA, 22 Jun 1981.

Intracavity dye laser photoacoustic spectroscopy is used to detect vibrational overtone transitions in order to understand intramolecular mode coupling in vibrationally excited, gaseous, organic molecules. (ERA citation 06:023989)

LBL-12540 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Role of Black Carbon in the Organic Chemistry of Atmospheric Aerosols.
L. A. Gundel, R. L. Dod, A. D. A. Hansen, H. Rosen, and S. G. Chang. Apr 81, 7p CONF-810475-2
Contract W-7405-ENG-48
Workshop on physics and chemistry of energy-related atmospheric pollution, Harper's Ferry, WV, USA, 21 Apr 1981.

Black carbon plays a significant role in the physics and chemistry of atmospheric aerosols because of its optical absorptivity, adsorption capacity, and surface characteristics. These properties affect the composition and chemical behavior of the associated organic material. Gas chromatographic and mass spectral studies indicate that particulate organic material contains unburned and partially oxidized fuel hydrocarbons, polynuclear aromatic hydrocarbons, and polyfunctional oxygenated compounds which may be formed in the atmosphere by reactions of hydrocarbons with atmospheric or pollutant gases. Carbonaceous aerosols were characterized using combustion evolved gas analysis (thermal analysis) with simultaneous optical attenuation measurements and selective solvent extraction. Thermograms of urban aerosols typically exhibit three broad peaks when evolved CO sub 2 concentration is plotted versus heating temperature. Sample thermograms are shown. Field and characterization studies indicate that the ratios of secondary to primary carbon in urban particulate matter are similar for samples collected in Berkeley, Los Angeles, and New York City, irrespective of the level of photochemical activity at the sampling sites. The fraction of black carbon to total carbon in urban carbonaceous particles is approximately constant, independent of sampling location or time of year. (ERA citation 06:022532)

LBL-12724 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Symmetry Operators of Generalized Wreath Products and Their Applications to Chemical Physics.
K. Balasubramanian. May 81, 37p CONF-810655-1
Contract W-7405-ENG-48
SIAM conference on applications of descrete mathematics, Troy, NY, USA, 10 Jun 1981.

Symmetry operators of generalized wreath product groups are formulated. Several applications of these operators to nonrigid molecular problems in chemical physics are outlined. (ERA citation 06:024449)

N77-83596/5 PC **A02**/MF **A01**
Purdue Research Foundation, Lafayette, IN.
Volatile Trace Elements in Primitive Meteorites.
Semiannual progress rept. no. 12, Mar-Aug 77.
Michael E. Lipschutz. 1 Sep 77, 12p NASA-CR-153980
Grant NGL-15-005-140

During the period covered by this Report the authors have devoted most of our efforts to studies of various chemical and physical changes induced in primitive meteorites heated under conditions simulating open-system, thermal metamorphism in early parent bodies. They summarize our progress during the past 6 months in categories subdivided according to the very different techniques used: mobile trace elements in unheated chondrites and samples heated from 400-1000C; mobile trace elements in samples heated from 1000-1500C; mobile trace element transport mechanisms; mineralogic and petrologic studies; major and minor elements in samples heated from 1000-1500C; noble gas measurements; carbon and sulfur measurements.

N81-26275/0 PC **A13**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
The Lewis Chemical Equilibrium Program with Parametric Study Capability.
R. Sevigny. May 81, 287p NASA-CR-161811
Contract NAS8-31640

The program was developed to determine chemical equilibrium in complex systems. Using a free energy minimization technique, the program permits calculations such as: chemical equilibrium for assigned thermodynamic states; theoretical rocket performance for both equilibrium and frozen compositions during expansion; incident and reflected shock properties; and Chapman-Jouget detonation properties. It is shown that the same program can handle solid coal in an entrained flow coal gasification problem.

N81-26276/8 PC **A12**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
Addition to the Lewis Chemical Equilibrium Program to Allow Computation from Coal Composition Data.
R. Sevigny. Dec 80, 271p NASA-CR-161809
Contract NAS8-31640

Changes made to the Coal Gasification Project are reported. The program was developed by equilibrium combustion in rocket engines. It can be applied directly to the entrained flow coal gasification process. The particular problem addressed is the reduction of the coal data into a form suitable to the program, since the manual process is involved and error prone. A similar problem in relating the normal output of the program to parameters meaningful to the coal gasification process is also addressed.

ORNL/MIT-286 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Heat Transfer Characteristics of Phase-Changing Materials.
M. A. Makarewicz, W. C. Cheng, and J. U. Nwalor. 23 Feb 79, 41p
Contract W-7405-ENG-26

Experimental melting rate and temperature distribution data were obtained for n-octadecane under conduction and natural-convection conditions. Results were in qualitative agreement with theoretical predictions; however, the experimental melting rate exceeded the predicted value by about 20% in the former case. When free convection was the predominant mode of heat transfer, the bulk liquid temperature and the melting rate were constant throughout the process. (ERA citation 05:003125)

PAT-APPL-6-237 818 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Identification of Chrysotile.
Patent Application,
William L. Jones. Filed 25 Feb 81, 6p PB81-222663, DOCKET/MIN-3004
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Chrysotile asbestos is selectively identified in construction and insulation materials by staining with an aqueous alcoholic solution of sodium hyroride and Clayton Yellow dye. Chrysotile fibers are identified by the reddish-orange complex formed by reaction of the dye and magnesium in the chrysotile structure.

PATENT-4 230 633
Not available NTIS
Department of Energy, Washington, DC.
Novel Fischer-Tropsch Catalysts.
Patent,
P. Perkins, and K. P. Vollhardt. Filed 17 May 79, patented 28 Oct 80, 7p PAT-APPL-6-039 986
Supersedes PAT-APPL-6-039 986.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Novel polymer-supported metal complexes of the formula: ps -R Me(CO)nHm where: ps represents a divinylbenzene crosslinked polystyrene in which the divinylbenzene crosslinking is greater than 1% and less than about 18%; R represents a cycloalkadienyl radical of 4 through 6 carbon atoms; Me represents a group viii metal; CO represents a carbonyl radical; H represents hydrogen; n represents an integer varying from 0 through 3; m represents an integer varying from 0 through 2 inclusively with the further provision that 2n+m must total 18 when added to the electrons in R and me, or n+m must total 0; are prepared by: brominating ps -H by treating same with bromine in the presence of a thallium salt in a partially or fully halogenated solvent to form ps -Br; treating said ps -Br so produced with a lithium alkyl of 1 through 12 carbon atoms in an aromatic solvent to produce ps -li; substituting said ps- Li so produced by reaction with a 2-cycloalkenone of 4 to 6 carbon atoms in the presence of an ether solvent and using a water work-up to form a cycloalkenylalcoholsubstituted ps ; dehydrating said alcohol so produced by heating under a vacuum to produce a cycloalkadienyl-substituted ps ; reacting the cycloalkadienyl-substituted ps with metal carbonyl in the presence of a partially or fully halogenated hydrocarbon, aromatic hydrocarbon of 6 through 8 carbon atoms, ethers, or esters of 4 through 10 carbon atoms as a solvent to produce a polystyrene-supported cycloalkadienyl metal carbonyl. The novel compounds are used as improved Fischer-Tropsch catalysts particularly for the conversion of CO+H2 to gaseous and liquid hydrocarbons at milder conditions than with prior catalysts. (ERA citation 06:023253)

PATENT-4 231 865
Not available NTIS
Department of the Interior, Washington, DC.
Backwashing Reverse-Osmosis and Ultrafiltration Membranes by Electro-Osmosis.
Patent,
Kurt S. Spiegler. Filed 7 Aug 79, patented 4 Nov 80, 4p PB81-222606, PAT-APPL-6-064 466
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Improved efficiency of reverse-osmosis and ultrafiltration processes is achieved by backwashing membranes by means of electroosmosis. This is achieved by application of an electric potential across the membrane, thereby causing a backflow of water through the membrane.

PB81-213738 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Some Chemical Characteristics of Trotyl. A Literature Inventory (Naegra Kemiska Egenskaper hos Trotyl. En Litteraturundersoekning),
Goeran Aqvist. Sep 80, 38p FOA-C-20370-D1
Text in Swedish, Abstract in English.

The report outlines literature on trotyl, reviewed in Chemical Abstracts during the last 10 years (1969-79). The selected studies deal primarily with thermic characteristics, propulsion tendencies in the presence of other substances and fixing of constants.

PB81-214900 PC **A07**/MF **A01**
Battelle Columbus Labs., OH.
Solid Waste: Methodology for Evaluation. Volume I: Tests for Potential Mobility of Toxic Components as Leachates,
M. M. McKown, J. S. Warner, R. M. Riggin, M. P. Miller, and R. E. Heffelfinger. Jan 81, 136p
Contract EPA-68-03-2552
See also Volume 2, PB81-214918.

Battelle Columbus Laboratories conducted this research program to develop a method for assessing potential mobility of organic compounds from a waste codisposed in a municipal landfill. Inorganic constituents were monitored to provide a basis for comparison with previous research in the field using distilled water, 0.5 N acetic acid titration (extraction procedure-EP), and other leaching media. A literature survey and contacts with key scientists served as the basis for assessing state-of-the-art leachate research. A quality assurance study to assess the precision and accuracy of analytical methods to be used to evaluate the leachates and wastes was conducted prior to initiation of leachate research. An interlaboratory comparison study of potential mobility procedure developed by Battelle and the total content method developed by Southern Research Institute (SoRI) was performed jointly by both laboratories. The ink pigment and still bottoms wastes were used for the interlaboratory comparison of the methods. The advantages and disadvantages of the various analytical methods used throughout the program to determine metals and organics are discussed in detail. It was concluded that the leaching procedure and analytical methods used meet all of the

original objectives of the program including feasibility of implementation at a cost of under $1850 per sample.

PB81-216640 Not available NTIS
National Bureau of Standards, Washington, DC.
MCSCF Pseudopotential Calculations for the Alkali Hydrides and Their Anions.
Final rept.,
W. J . Stevens, A. M. Karo, and J. R. Hiskes. 1 Apr 81, 11p
Pub. in Jnl. of Chemical Physics 74, n7 p3989-3998, 1 Apr 81.

Multiconfiguration self-consistent-field calculations have been carried out on the X singlet Sigma (+) and a triplet Sigma (+) states of LiH, NaH, KH, RbH, and CsH, and on the X doublet Sigma (+) states of their respective anions. Pseudopotentials, including core polarization terms, have been used to replace the core electrons, resulting in simple two- and three-electron calculations. Comparisons of the neutral potential curves with experiment and other ab initio calculations (where available) show very good agreement. The agreement with ab initio calculations on LiH(-1) and NaH(-1) is also very good. Adiabatic electron affinities have been calculated for LiH (0.293 ev), NaH (0.316 eV), KH (0.437 eV), RbH (.422 eV), and CsH (0.438 eV).

PB81-216657 Not available NTIS
National Bureau of Standards, Washington, DC.
Hydrogen Spillover on Alumina--A Study by Infrared Spectroscopy.
Final rept.,
R. R. Cavanagh, and J. T. Yates. 1981, 5p
Pub. in Jnl. of Catalysis 68, p22-26 1981.

Infrared spectroscopy has been used to monitor the exchange of D2 (g) with OH groups chemisorbed on Al2O3. It has been shown that near 300K, the rate of the exchange process is rapid in the presence of supported Rh particles on the Al2O3. A qualitative model for hydrogen 'spillover' is presented in which dissociative adsorption of dihydrogen by the metal is a key step. It is shown that CO chemisorption on the supported Rh leads to a marked reduction in the 'spillover' rate due to site blockage on the Rh. This is consistent with recent studes of behavior of the CO and H coadsorbed on Rh (111).

PB81-216665 Not available NTIS
National Bureau of Standards, Washington, DC.
Dielectric Friction and Dielectric Dispersion in Electrolyte Solutions with Spin.
Final rept.,
J. B. Hubbard, and R. F. Kayser. 15 Mar 81, 11p
Pub. in Jnl. of Chemical Physics 74, n6 p3535-3545, 15 Mar 81.

A self-consistent continuum model of dielectric friction on a moving ion is developed in which the only adjustable parameters are the hydrodynamic boundary conditions and a 'rotational viscosity' eta (R).

PB81-216681 Not available NTIS
National Bureau of Standards, Washington, DC.
Viscosity-Temperature Relationships at 1 ATM in the System Diopside-Anorthite.
Final rept.,
C. M. Scarfe, D. Cronin, J. Wenzel, and D. Kauffman. 1980, 4p
Paper in Carnegie Institution of Washington Year Book 79. Annual Report of the Director Geophysical Laboratory, n1825 p315-318 1980.

The viscosity as a function of temperature has been measured for six melts in the diopside-anorthite system in the range 1175-1625 C. The results are fitted to Arrhenius and Fulcher equations.

PB81-216707 Not available NTIS
National Bureau of Standards, Washington, DC.
4 doublet s 4 triplet p-4s 4 quadruplet p and 4 doublet s 4 triplet p-4 doublet s 4 doublet p 5s Transitions in Y VII Zr VIII, Nb IX, and Mo X.
Final rept.,
J. Reader, and N. Acquista. Apr 81, 8p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Jnl. of the Optical Society of America 71, n4 p434-441 Apr 81.

Spectra of ionized Y, Zr, Nb, and Mo have been observed in sliding-spark and triggered-spark discharges on 10.7-m normal-and grazing-incidence spectrographs at the National Bureau of Standards in Washington, DC. From these observations the 4 doublet s 4 triplet p - 4s 4 quadruplet p transitions in Y VII, Zr VIII, Nb IX, and Mo X have been identified. The 4 doublet s 4 triplet p - 4 doublet s 4 doublet p 5s transitions in Y VII-Mo X, previously identified by Rahimullah et al.

PB81-216723 Not available NTIS
National Bureau of Standards, Washington, DC.
Adsorption of N-(2-Hydroxy-3-Methacryloxypropyl)-N-Phenylglycine (NPG-GMA) on Cupric Ion-Enriched Hydroxyapatite Surface to Improve Chemical Bonding between Dental Resins and Teeth.
Final rept.,
D. N. Misra, and R. L. Bowen. Apr 81, 5p
Contract PHS-DE-05129-01
Pub. in Biomaterial 2, p78-82 Apr 81.

In continued studies of chemical bonding between a polymer and teeth through the mediation of coupling agents, the adsorption of N-(2-hydroxy-3-methacryloxypropyl)-N-phenylglycine (NPG-GMA) from ethanol solution was studied on cupric ion-treated synthetic hydroxyapatite in order to discriminate the adsorptive behaviour of the 'mordanted' as against the unmordanted (or pure) apatite.

PB81-216749 Not available NTIS
National Bureau of Standards, Washington, DC.
The Dielectric Constant of SF6 Near the Critical Point.
Final rept.,
B. J. Thijsse. 15 Apr 81, 15p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Jnl. of Chemical Physics 74, n8 p4678-4692, 15 Apr 81.

Measurements are reported of the dielectric constant of SF6 at the critical density (+ or - %) over a temperture range of - .001 less than (T-T(c))/T(c) less than + . 01 The experimental cell was especially designed to suppress spurious effects resulting from temperature gradients and gravity. Temperature stability was better than + or - 20 muK and capacitance stability better than 0.5 ppm over several days. The critical temperature was determined as 318.718 + or - 0.002 K and was completely free of drift. Capacitance data were reproduced within a few ppm over the duration of the experiment. No direct evidence of ε (T-T(c))sup(1-a) anomaly was found; an upper bound of 5ppm is established. Effects of fluid stratification and phase separation were clearly seen and are well understood. We find a value of 0.325 + or - 0.005 for the critical exponent beta.

PB81-216764 Not available NTIS
National Bureau of Standards, Washington, DC.
Site Distribution Studies of Rh Supported on Al2O3--An Infrared Study of Chemisorbed CO.
Final rept.,
R. R. Cavanagh, and J. T. Yates. 1 Apr 81, 6p
Sponsored in part by Office of Naval Research, Washington, DC. See also report dated May 80, AD-A-084 852.
Pub. in Jnl. of Chemical Physics 74, n7 p4150-4155, 1 Apr 81.

Using infrared spectroscopy, chemisorbed CO has been employed as a surface probe to observe differences in Rh site distributions on Al2O3-supported Rh.

PB81-216798 PC **A03**/MF **A01**
Geological Survey, NSTL Station, MS. Gulf Coast Hydroscience Center.
Extraction and Analysis of Adenosine Triphosphate from Aquatic Environments.
Water-resources investigations,
Doyle W. Stephens, and David J. Shultz. Apr 81, 35p USGS/WRD/WRI-81/049, USGS/WRI-81/5

A variety of adenosine triphosphate (ATP) extraction procedures have been investigated for their applicability to samples from aquatic environments. The cold sulfuric-oxalic acid procedure was best suited to samples consisting of water, periphyton, and sediments. Due to cation and fulvic acid interferences, a spike with a known quantity of ATP was necessary to estimate losses when sediments were extracted. Variable colonization densities for periphyton required that several replicates be extracted to characterize accurately the periphyton community. Extracted samples were stable at room temperature for one to five hours, depending on the ATP concentration, if the ph was below 2. Neutralized samples which were quick frozen and stored at -30C were stable.

PB81-217341 PC **E17**/MF **E17**
Commission of the European Communities, Luxembourg.
Proceedings of the European Symposium on Physico-Chemical Behaviour of Atmospheric Pollutants (1st) Held at Ispra Establishment, Italy on 16-18 October 1979,
B. Versino, and H. Ott. c1980, 529p EUR-6621-DE-EN-FR
Prepared in cooperation with Joint Research Centre, Ispra Establishment (Italy).
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The first European Symposium 'Physico-chemical behaviour of atmospheric pollutants' has been organized by the Commission of the European Communities within the framework of a Concerted Action executed under the same title, known also under the code 'COST Project 61a', as a part of the Communities' research activities in the environmental field. With the aid of a 'concerted Action Committee' composed of delegates and expert from the participating countries, some 150 ongoing relevant research projects were identified, including research done in the Communities' own Joint Research Center. Five working parties were set up, covering the following aspects of the conversion of atmospheric pollutants: Detection, identification and analysis of pollutants; Chemical and photochemical reactions, mechanisms and rates; Aerosol characterization and particle formation; Pollutant cycles (sources and sinks); Transport and modelling. (Copyright (c) ECSC-EEC-EAEC, Brussels-Luxembourg, 1980.)

PB81-218315 PC **A04**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
An Evaluation of the Hewlett-Packard 5993B Gas Chromatograph-Mass Spectrometer,
Denis L. Foerst. Jun 81, 53p EPA-600/4-81-043

This report gives the results of an evaluation of a Hewlett-Packard Model 5993B computerized gas chromatograph/mass spectrometer. The evaluation was done according to the procedures found in EPA research report number EPA-600/4-80-025, 'Performance Tests for the Evaluation of Computerized Gas Chromatography/Mass Spectrometry Equipment and Laboratories.' Changes in the 'Performance Test' specifications for the BFB spectrum validation test have been made and are noted in the results for Tests 1 and 8. The system performed satisfactorily during the evaluation and is acceptable for the analyses of organic compound using methods similar to EPA Methods 624 and 625. The HP-5993B system produced valid mass spectra, exhibited good to excellent stability, and gave a satisfactory detection limit. The precision and accuracy for external or internal quantitation using direct sample injection or purge and trap were excellent. Both 14 AMU and PBS mass spectral library searches were accurate; however, the search times using the PBS library search were longer than the requirements 'Performance Tests'. Some problems, particularly with brominated compounds, were discovered during this evaluation. The manufacturer corrected the instrument to alleviate these problems.

PB81-221731 Not available NTIS
National Bureau of Standards, Washington, DC.
Current Research at NBS Using Synchrotron Radiation at SURF-II.
Final rept.,
A. C. Parr, G. Rakowsky, D. L. Ederer, and R. L. Stockbauer. Apr 81, 5p

Sponsored in part by Department of Energy, Washington, DC., and Office of Naval Research, Washington, DC.
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science NS-28, n2 p1210-1214 Apr 81.

The National Bureau of Standards (NBS) Synchrotron Ultraviolet Radiation Facility (SURF-II) is used in conjunction with a high flux normal incidence monochromator for angle resolved wavelength dependent photoelectron studies. The recent work has concentrated on studies of the effect of shape resonances on molecular vibrational intensity distributions as well as the effects of autoionization upon the vibrational intensity distributions over narrow wavelength regions. Results for CO, N2, Ar and Xe will be discussed.

PB81-222721 PC **A20**/MF **A01**
Lafayette Coll., Easton, PA. Dept. of Chemistry.
Manual of Analytical Quality Control for Pesticides and Related Compounds in Human and Environmental Samples,
Joseph Sherma. Apr 81, 468p EPA-600/2-81-059
Contract EPA-68-02-2474
See also Jan 79, PB-298 711.

This manual provides the pesticide chemist with a systematic protocol for the quality control of analytical procedures and the problems that arise in the analysis of human or environmental media. It also serves as a guide to the latest and most reliable methodology available for the analysis of pesticide residues in these and other sample matrices. The sections dealing with inter- and intra-laboratory quality control, the evaluation and standardization of materials used, and the operation of the gas chromatograph are intended to highlight and provide advice in dealing with many problems which constantly plague the pesticide analytical chemist. Many aspects of the problem areas involved in extraction and isolation techniques for pesticides in various types of samples are discussed. Techniques for confirming the presence or absence of pesticides in sample materials are treated at some length. This highly important area provides validation of data obtained by the more routine analytical procedures. The gas chromatograph, being the principal instrument currently used in pesticide analysis, often requires simple servicing or troubleshooting. A section addressing some of these problems is included. Last, but by no means least in importance, is a short dissertation of the value and need for systematic training programs for pesticide chemists.

PB81-222861 PC **A03**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Group.
Review of Experimental Methods for Determining Effective Diffusivities in Catalyst Pellets,
D. S. Van Vuuren. Mar 80, 33p CSIR-SR-CENG-319

The steady state Wicke-Kallenbach method is preferred for the determination of gas phase diffusivities, but is unsuitable for work in the liquid phase. For the latter transient methods should be used. Stirred tank methods are normally used for multiple pellet work and pulse liquid chromatography may provide a suitable alternative. For single pellets the continuous stirred tank method and the closed chamber Wicke-Kallenbach method are the most promising.

PB81-223463 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Selected Values of Chemical Thermodynamic Properties: Compounds of Uranium, Protactinium, Thorium, Actinium, and the Alkali Metals.
Final rept.,
D. D. Wagman, W. H. Evans, V. B. Parker, R. H. Schumm, and R. L. Nuttall. May 81, 153p NBS-TN-270-8
See also report dated Apr 73, COM-73-50435.

This publication contains tables of recommended values for the standard enthalpies (heats) of formation, Gibbs (free) energies of formation, entropies, enthalpy contents and heat capacities at 298.15 K, and enthalpies of formation at O K for compounds of uranium, protactinium, thorium, actinium, lithium, sodium, potassium, rubidium, cesium, and francium.

PB81-224644 PC **A02**
Scripps Institution of Oceanography, La Jolla, CA.
Tricyclic Diterpenoids of the Dolastane Ring System from the Marine Alga 'Dictyota divaricata',
H. H. Sun, O. J. McConnell, William Fenical, Ken Hirotsu, and Jon Clardy. c1981, 7p NOAA-81042707
Grant NOAA-04-7-158-44121
Pub. in Tetrahedron, v37 p1237-1242 1981. Prepared in cooperation with Cornell Univ., Ithaca. Dept. of chemistry.

Four new oxygenated tricyclic diterpenoids have been isolated from the Caribbean brown alga Dictyota divaricata. The structures of these new compounds were secured by an X-ray analysis of a convenient diol derivative, followed by interconversion where possible. The new diterpenoids belong to the dolastane group first isolated from the herbivorous mollusc Dolabella auricularia, and their isolation here indicates that the sea hare most likely derived these compounds from brown seaweeds of the family Dictyotaceae. (Copyright (c) Pergamon Press Ltd.)

UCRL-85858 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Molecular Resonance Phenomena.
A. U. Hazi. 1980, 17p CONF-8005162-1
Contract W-7405-ENG-48
Workshop on electron-atom and electron-molecule collisions, Bielefeld, F.R. Germany, 5 May 1980.

It is attempted to show that the Stieltjes-moment-theory provides a practical and a reasonably accurate method for calculating the widths of molecular resonances. The method seems to possess a number of advantages for molecular applications, since it avoids the explicit construction of continuum wavefunctions. It is very simple to implement the technique numerically, because it requires only existing bound-state electronic structure codes. Through the use of configuration interaction techniques, many-electron correlation and polarization effects can be included in the description of both the resonance and the non-resonant background continuum. To illustrate the utility and the accuracy of the Stieltjes-moment-theory technique, used in conjunction with configuration interaction (CI) wave functions, recent applications to the exp 1 sigma /sub u/(1sigma/sub u/ 2sigma/sub g/) autoionizing resonance state of H sub 2 and the well known exp 2 PI/sub g/ state of N sub 2- are discussed. The choices of the one-electron basis sets and the types of many-electron configurations appropriate for these two cases are described. Also, guidelines for the selection of the projection operators defining the resonant and non-resonant subspaces in the case of both Feshbach and shape-resonances are given. The numerical results indicate that the Stieltjes-moment-theory technique, which employs L exp 2 basis functions exclusively, produces as accurate resonance parameters as can be extracted from direct electron-molecule scattering calculations, provided approximately the same approximations are used to describe important physical effects such as target polarization. Furthermore the method provides sufficiently accurate fixed-nuclei electronic resonance parameters to be used in ab initio calculation of resonant vibrational excitation cross sections. (ERA citation 06:022792)

7E. Radio and Radiation Chemistry

AD-A101 086/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Laser Microphotochemistry for Use in Solid-State Electronics.
Journal article,
Daniel J. Ehrlich, Richard M. Osgood, and Thomas F. Deutsch. 4 Mar 80, 12p JA-5083, ESD-TR-81-27
Contract F19628-80-C-0002
Pub. in IEEE Jnl. of Quantum Electronics, vQe-16 n11 p1233-1243 Nov 80.

No abstract available.

UCID-18509-80-1 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Development of Advanced Technologies for Photochemical Tritium Recovery. Quarterly Progress Report, January 1, 1980-March 31, 1980.
I. P. Herman, and J. B. Marling. 23 Apr 80, 8p
Contract W-7405-ENG-48

Progress has been made in building the laboratory facility for photochemical tritium separation research. Initial IR photolysis experiments have been performed in CDCl sub 3 /CHCl sub 3 to better understand the photochemistry in the CTCl sub 3 / CDCl sub 3 system anticipated to be useful in photochemical tritium recovery. (ERA citation 06:022394)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

PB81-214785 PC **A13**/MF **A01**
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
The Distribution and Abundance of Ichthyoplankton in the Middle Atlantic Bight as Determined from Coastal Surveys and Site-Specific Studies, 1965-1976.
Final rept.,
W. G. Smith, Alyce Wells, and Donald G. McMillan. Jan 79, 279p SHL-79-02, BLM/YL/SR-79/05

Ichthyoplankton data from the files of the Sandy Hook Marine Laboratory are summarized from collections in the Middle Atlantic Bight between 1965 and 1976. The data are compiled from plankton samples collected on coastal surveys designed to monitor seasonal shifts in the distribution and abundance of planktonic fishes, and from site-specific studies designed to investigate the vertical distribution and diel movements of larvae representing selected species. The report describes occurrences and seasonal patterns of distribution of larvae for the numerically dominant species collected on the 13-month R/V Dolphin survey in 1965-66; a 15-month survey of the New York Bight from 1974 to 1976; and semi-annual surveys from Cape Hatteras to Martha's Vineyard from 1973 to 1976.

PB81-216020 PC **A07**/MF **A01**
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Benthic Survey of the Baltimore Canyon Trough, May 1974.
Final rept.,
David J. Radosh, Ann B. Frame, Thomas E. Wilhelm, and Robert N. Reid. Sep 78, 139p SHL-78-8, BLM/YL-SR-78/01
Contract DI-AA550-IA7-35

The study analyzed benthic grab samples from two sites in the Baltimore Canyon Trough. Surficial sediments were basically medium to fine sands; heavy metal (Cd, Cr, Ni, Pb, Zn) concentrations were low or undetectable; and the benthic infauna were dominated by polychaetes and peracarid crustaceans. An assessment of possible impacts from oil-related activities on the benthos was also made.

Group 8A—Biological Oceanography

PB81-220022 PC **A04**/MF **A01**
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Biological and Fisheries Data on Striped Searobin, 'Prionotus evolans' (Linnaeus),
Susan C. Roberts-Goodwin. Jan 81, 62p NMFS-NFC-TSR-25, NOAA-81050607

This report provides details on the striped searobin, Prionotus evolans. The biological and fisheries data include: nomenclature, taxonomy, morphology, distribution, bionomics and life history, population, exploitation, protection and management, and aquaculture.

PB81-220170 PC **A02**
Washington Univ., Seattle. Coll. of Fisheries.
Regional Variation in the Size of Maturity of Two Species of Tanner Crab (Chionoecetes bairdi and C. opilio) in the Eastern Bering Sea, and Its Use in Defining Management Subareas,
David A. Somerton. 1981, 15p CONTRIB-538, NOAA-81042919
Pub. in Canadian Jnl. of Fisheries and Aquatic Sciences, v38 n2 p163-174, 1981.

Minimum size limits for the commercial harvest of tanner crab (Chionoecetes bairdi and C. opilio) are based on the sizes of sexual maturity. Establishing such size limits in the eastern Berging Sea is complicated by a large regional variation in the size of maturity. A computer technique was developed which partitioned the eastern Bering Sea into subareas that were relatively homogeneous with respect to the size of maturity.

PB81-220816 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Distributions of Surficial Sediment and Eelgrass in Great South Bay, New York (from Smith Point, West to Wantagh State Parkway),
Clifford R. Jones, and J. R. Schubel. Sep 80, 42p SR-39, REF-80-6, NOAA-81042912
Prepared in cooperation with Long Island Regional Planning Board, NY.

Great South Bay is a bar-built estuary located along the south shore of Long Island. It is shallow and receives runoff from more than forty streams and rivers. In addition to being a seasonal recreational area, Great South Bay is noted for its tremendous harvest of hard clams and also has many varieties of finfish that support commercial and recreational fisheries. With increases in population along the shorelines, stresses on the bay have increased. The amounts of pollutants added to streams have intensified. Since many of these, including most metals and chlorinated hydrocarbons, are relatively insoluble in water, they are scavenged rapidly from solution near their points of introduction by suspended particulate matter. Many end up on the bottom of Great South Bay in channels and other areas where fine-grained sediments are accumulating. The objectives of this study were to map the texture of the surficial sediments, their organic content, and the distribution of eelgrass.

PB81-220881 PC **A10**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Biological Effects of Sand and Gravel Mining in the Lower Bay of New York Harbor: An Assessment from the Literature,
B. H. Brinkhuis. Jan 80, 205p SR-34, REF-80-1, NOAA-81043002

An assessment of potential biological effects of sand and gravel mining in the Lower Bay Complex of New York Harbor is made from the currently available literature concerning distribution and abundance of organisms in the Lower Bay Complex in relation to what is known about effects associated with sand and gravel mining/dredging operations. In particular, the effects of suspended sediments on various organisms are examined. The assessment encompasses suspended sediment effects on benthic infauna (e.g., shellfishes, worms, and other burrowing animals) and epibenthic fauna, including amphipods, crustacea, and demersal fishes. Other effects associated with mining/dredging operations, e.g., release of contaminants and nutrients from sediments are also examined.

PB81-221335 PC **A02**
Rhode Island Univ., Kingston. Dept. of Zoology.
Antennae-Whipping Behavior in the American Lobster, 'Homarus americanus' (Milne-Edwards),
Michael H. Solon, and J. Stanley Cobb. c1980, 12p MARINE REPRINT-126, NOAA-81042904
Grant NA79AA-D-00096
Pub. in Jnl. of Experimental Marine Biology and Ecology, v48 p217-224 1980.

Electrophysiological techniques were employed to demonstrate that an acrylic coating blocks the mechanosensory activity of the cuticular hair organs on the chelipeds of Homarus americanus (Milne-Edwards) without eliciting spurious activity in their innervation. Agonistic encounters between animals with acrylic on the dorsal surface of the claws (experimental), on the ventral surface of the claws ('plastic' control), and absent ('bare' control) were observed. Experimental animals responded to less than 3% of all antennae-whips, while 'plastic' control animals responded to 73% and 'bare' control animals to 64% of all antennae-whips. The authors conclude that antennae-whipping is a form of tactile communication, in which information probably is received through mechanosensory activity in the cuticular hair organs on the dorsal surface of the chelipeds.

PB81-221343 PC **A02**
Rhode Island Univ., Kingston. Dept. of Zoology.
The External Morphology and Distribution of Cuticular Hair Organs on the Claws of the American Lobster, 'Homarus americanus' (Milne-Edwards),
Michael H. Solon, and J. Stanley Cobb. c1980, 15p MARINE REPRINT-125, NOAA-81042903
Grant NA79AA-D-00096
Pub. in Jnl. of Experimental Marine Biology and Ecology, v48 p205-215 1980.

Four classes of microscopic cuticular hair organs were found on the chelae of Homarus americanus (Milne-Edwards). Type I and Type II organs possess long single sensillae, 30-60 micro m and 70-130 micro m, respectively. Type III organs are toroid bumps 20-30 micro m in diameter, with a small tuft of fibers projecting from the center. Type IV organs are small conical hairs approximately 1 micro m in length. Type IV organs were uniformly distributed over the claws. The distributions of Types I, II, and III organs were analysed through multivariate analysis of variance (MANOVA) with respect to claw, side, and area. Type I organs showed significance of the three-way interaction only. Type II organs showed significance of side, area, and the claw by area interaction. Type III organs showed significance of area, and all interactions. Changes in number and density of Types I, II, and III organs, and in the number of Type IV organs, were found with growth.

PB81-221392 PC **A04**/MF **A01**
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Biological and Fisheries Data on Northern Puffer, 'Sphoeroides maculatus' (Bloch and Schneider).
Technical series rept.,
John D. Sibunka, and Anthony L. Pacheco. Feb 81, 69p NOAA/NMFS/NFC-TSR-26, NOAA-81050605

This report provides details on the northern puffer, Sphoeroides maculatus. The biological and fisheries data include: nomenclature, taxonomy, morphology, distribution, bionomics and life history, population, exploitation, protection and management, and aquaculture.

PB81-225591 PC **A02**
Maine Univ. at Orono.
Polyploidy Induced in the American Oyster, 'Crassostrea virginica', with Cytochalasin B,
Jon G. Stanley, Standish K. Allen, Jr., and Herbert Hidu. c1981, 11p NOAA-81050801
Grant NOAA-04 7-158-44034
Pub. in Aquaculture, v23 p1-10 1981.

Polyploidy was induced in the American oyster by treating the zygote with cytochalasin B. In treatments begun at 50 min after fertilization and lasting 20 min, 13 of 22 oysters treated with 0.1 mb/l cytochalasin and 3 of 4 treated with 1.0 mg/l were polyploid. In treatments with 0.5 mg/l, cytochalasin given from 0 to 15 min after fertilization resulted in 10 polyploids out of 20 and, from 15 to 30 min, 34 ploypoids out of 46 examined. Juvenile oysters had about the same percentage of polyploid individuals as embryos. Only triploids were seen at 8 months, whereas triploids and tetraploids were observed in embryos. Oysters developed from treated zygotes set normally and subsequent survival was indistinguishable from those of controls. At 8 months the control and treated oysters both averaged 13 mm in shell height. Survival at 24 h was about 33% that of controls for the 0.1 mg/l treatment and 15% for the 1.0 mg/l treatment. Survival was greater for oysters treated for 15 min beginning immediately after fertilization than if treatment began later at 15 or 40 min.

8C. Dynamic Oceanography

AD-A100 650/1 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Geophysical Fluid Dynamics Inst.
Laboratory Modelling of the Oceanic Response to Monsoonal Winds.
Technical rept.,
Ruby E. Krishnamurti. 1981, 21p Rept nos. CONTRIB-148, TR-20
Contract N00014-75-C-0877
Pub. in Monsoon Dynamics, p557-576 n.d.

No abstract available.

AD-A100 683/2 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Displaced Antarctic Diatoms in the Amirante Passage.
Journal article,
Lloyd H. Burckle. 22 Apr 80, 6p Rept no. LDGO-3061
Contract N00014-75-C-0210, Grant NSF-OCE77-22893
Pub. in Marine Geology, v39 pM39-M43 1981.

No abstract available.

AD-A100 775/6 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Field Evaluation of Sea Data Directional Wave Gage (Model 635-9).
Technical rept.,
D. G. Aubrey. May 81, 61p WHOI-81-28, ARO-16710.1-GS
Contract DAAG29-81-K-0004, Grant NA79AA-D-00102
Sponsored in part by Grant NA80AA-D-00077.

A directional wave gage consisting of a two-axis electromagnetic current meter and a pressure sensor, developed by Sea Data Corporation, with modifications specified by the author, was successfully deployed during the joint NOAA/U.S. Army Corps of Engineers Coastal Engineering Research Center's Atlantic Remote Sensing Land/Ocean Experiment (ARSLOE) during November, 1980. Data recovery rate was 100%, and instrument function was verified through comparison with a four-element pressure sensor array at the same location, an X-band imaging radar, and with surface meteorological observations charting developing local wave fields. The instrument was proven to be a viable alternative for point measurements of directional wave fields and for estimating the first five fourier coefficients in a directional wave model. (Author)

AD-A100 805/1 PC **A03**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Plane Tidal Waves Generated by an Array of Simultaneous Underwater Explosions.
Master's Thesis,
Henry James Weber. Mar 81, 45p Rept no. AFIT/GNE/PH/81M-11

This report considers an array of simultaneous underwater nuclear explosions generating plane tidal waves on the continental shelf. Computer simula-

tions are used to study this wave generation process. They are based on non-linear shallow water theory with an initial condition of a stationary raised cone of water. The sensitivity of the wave height to different yields, combination of different yields, spacing, alignment, timing, and bottom slope is determined. The reference values used for this study are a yield of five kilotons TNT, one kilometer spacing, water depth of 100 meters, and no bottom slope. In addition to the sensitivities, the amount of non-linear effect is illustrated by comparison of wave contour printer-plots generated by linear and non-linear shallow water theory. The computer results indicate the wave generation is relatively insensitive to realistic variations in the parameters. (Author)

AD-A100 871/3 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology and Physical Oceanography.
Method for Estimation of Ocean Current Velocity from Satellite Images,
Erik Mollo-Christensen, Peter Cornillon, and Alfonso Da S. mascarenhas, Jr. 29 Oct 80, 2p
Availability: Pub. in Science, v212 p661-662, 8 May 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 872/1 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
Modulational Stability of Short-Crested Free Surface Waves,
Erik Mollo-Christensen. 17 Jun 80, 2p
Contract N00014-76-C-0413, Grant NSF-ATM77-18301
Availability: Pub. in Physical Fluids, v24 n4 p775-776 Apr 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 939/8 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Observations of the Velocity Response to Wind Forcing in the Upper Ocean.
Technical rept.,
Robert A. Weller. 12 Feb 80, 15p Rept nos. WHOI-81-54, WHOI-CONTRIB-4504
Contract N00014-75-C-0152
Pub. in Jnl. of Geophysical Research, v86 nC3 p1969-1977, 20 Mar 81.

No abstract available.

AD-A100 940/6 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
The Influence of the Mid-Atlantic Ridge upon the Circulation and the Properties of the Mediterranean Water Southwest of the Azores.
Technical rept.,
Terrence M. Joyce. 8 May 80, 28p Rept no. WHOI-81-55
Contract N00014-76-C-0197
Pub. in Jnl. of Marine Research, v39 n1 p31-52 1981.

No abstract available.

AD-A101 121/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Modulational Stability of Short-Crested Free Surface Waves,
Erik Mollo-Christensen. 17 Jun 80, 3p
Contract N00014-76-C-0413, Grant NSF-ATM77-18301
Pub. in Physics of Fluids, v24 n4 p775-776, Apr 81.

No abstract available.

AD-A101 122/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology and Physical Oceanography.
Method for Estimation of Ocean Current Velocity from Satellite Images.
Erik Mollo-Christensen, Peter Cornillon, and Alfonso Da S. Mascarenhas, Jr. 29 Oct 80, 3p
Contracts N00014-79-C-0413, N00014-75-C-0291
Pub. in Science, v212 p661-662, 8 May 81.

No abstract available.

PB81-220782 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Civil Engineering.
Wave Propagation Over Rectangular Trench.
Preprint,
J. J. Lee, and R. M. Ayer. Dec 80, 17p NSF/RA-800544
Grant NSF-ENV77-01599

An analysis is presented for the propagation of water waves past a rectangular submarine trench. Two-dimensional, linearized potential flow is assumed. The fluid domain is divided into two regions along the mouth of the trench. Solutions in each region are expressed in terms of the unknown normal derivative of the potential function along this common boundary with the final solution obtained by matching. Reflection and transmission coefficients are found for various submarine geometries. The result shows that for a particular flow configuration, there exists an infinite number of discrete wave frequencies at which waves are completely transmitted. The validity of the solution in the infinite constant water depth region is shown by comparing with the results using a boundary integral method for given velocity distributions along the mouth of the trench. The accuracy of the matching procedure is also demonstrated through the results of the boundary integral technique. In addition, laboratory experiments were performed and are compared with the theory for two of the cases considered.

PB81-868200 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Direct Measurement of Ocean Currents. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 99p

Citations in this bibliography cover various observations, techniques, and devices for the direct measurement of ocean currents. Both general discussions and discussions of specific geographic locations are included. Some attention is given to observations and measurements of ocean currents with relation to offshore structures and operations, and to environmental concerns. (Contains 103 citations fully indexed and including a title list.)

PB81-872251 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind and Thermal Effects on the Flow of Equatorial Ocean Currents. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 57p

The effects of wind flow and thermal gradients on the flow of equatorial currents are considered. Both vertical and horizontal gradients are included, as is the additional effect of wave generation. The hydrodynamics of equatorial undercurrents are also considered. (Contains 60 citations fully indexed and including a title list.)

8E. Geodesy

PB81-219081 PC **A05**/MF **A01**
Geological Survey, Menlo Park, CA.
Principal Facts, Accuracies, Sources, Base Station Descriptions, and Plots for 1380 Gravity Stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada.
Final rept.,
R. W. Saltus, D. B. Snyder, and C. R. Karish. 1981, 89p USGS/GD-81/004
Prepared in cooperation with Department of Energy, Las Vegas, NV. Nevada Operations Office.

The principal facts contained in the tables of this report document 1380 gravity stations on the Tonopah 1 degree x 2 degree quadrangle, Nevada. Base station descriptions, location plots, and observed gravity base station values further describe these stations. All the stations have been reduced to complete Bouguer anomalis. Three sources provided original field measurements: the U.S. Geological Survey, Menlo Park; the Defense Mapping Agency/Topographic Center/Geodetic Survey Squadron; and the U. S. Geological Survey, Denver. Each source is documented as to meters used, calibration, and field terrain correction method.

8G. Geology and Mineralogy

AD-A100 938/0 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Fine-Scale Morphology and Structure of the Ridge and Trough Province, Upper Continental Slope, Southwest Florida,
J. D. Milliman, T. E. Pyle, and M. Rawson. 9 Apr 80, 13p Rept nos. WHOI-81-53, WHOI-CONTRIB-4537
Contract N00014-74-C-0262
Pub. in Bulletin of Marine Science, v31 n1 p134-140 1981.

No abstract available.

AD-A100 956/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Metamorphic Petrology, Mineral Equilibria, & Polymetamorphism in the Augusta Quadrangle, South-Central Maine,
James M. Novak, and M. J. Holdaway. 2 Aug 79, 21p Rept no. AFGL-TR-81-0176
Pub. in American Mineralogist, v66 p51-69 1981.

No abstract available.

AD-A100 970/3 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Continental Crust Beneath the Agulhas Plateau, Southwest Indian Ocean.
Journal article,
Brian E. Tucholke, Robert E. Houtz, and Douglas M. Barrett. 23 May 80, 18p Rept no. LDGO-3124
Contract N00014-75-C-0210, Grant NSF-OCE76-21782
Pub. in Jnl. of Geophysical Research, v86 nB5 p3791-3806, 10 May 81.

No abstract available.

DE81023984 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Geologic and Geophysical Investigations of the Zuni-Bandera Volcanic Field, New Mexico.
M. E. Ander, G. Heiken, J. Eichelberger, A. W. Laughlin, and S. Huestis. May 81, 41p LA-8827-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

A positive, northeast-trending gravity anomaly, 90 km long and 30 km wide, extends southwest from the Zuni uplift, New Mexico. The Zuni-Bandera volcanic field, an alignment of 74 basaltic vents, is parallel to the eastern edge of the anomaly. Lavas display a bimodal distribution of tholeiitic and alkalic compositions, and were erupted over a period from 4 Myr to present. A residual gravity profile taken perpendicular to the major axis of the anomaly was analyzed using linear programming and ideal body theory to obtain bounds on the density contrast, depth, and minimum thickness of the gravity body. Two-dimensionality was assumed. The limiting case where the anomalous body reaches the surface gives 0.1 g/cm exp 3 as the greatest lower bound on the maximum density contrast. If 0.4 g/cm exp 3 is taken as the geologically reasonable upper limit on the maximum density contrast, the least upper bound on the depth of burial is 3.5 km and minimum thickness is 2 km. A shallow mafic intrusion, emplaced sometime before Laramide deformation, is proposed to account for the positive gravity anomaly. Analysis of a magnetotelluric survey suggests that the intrusion is not due to recent basaltic magma associated with the Zuni-Bandera volcanic field. This large basement structure has controlled the development of the volcanic field; vent orientations have changed somewhat through time, but the trend of the volcanic chain followed the edge of the basement structure. It has also exhibited some control

on deformation of the sedimentary section. (ERA citation 06:023388)

DOE/ET/27111-2 PC **A03**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Using Presence of Calcite Cap Rock in Shales to Predict Occurrence of Reservoirs Composed of Leached Secondary Porosity in the Geopressured Zone. Annual Report, June 1, 1980-October 31, 1980.
W. R. Kaiser, K. Magara, K. L. Milliken, and D. L. Richmann. Jan 81, 36p
Contract AC08-79ET27111

The distribution of high-resistivity shale in the Frio Formation between hydropressured and geopressured strata has been mapped along the Texas Gulf Coast. Two high-resistivity intervals more than 1000 ft thick have been mapped, one in Brazoria and Galveston Counties and the other in Kenedy County. They coincide with Frio delta systems and may be related to extraordinary quantities of CO sub 2 produced by deltaic sediments rich in woody and herbaceous matter. Beyond being calcareous, the nature of the high-resistivity interval is enigmatic and its relationship to deep secondary porosity problematic. Most of the contained carbonate is microscopically and isotopically skeletal in origin, revealing no evidence of diagenetic modification. Minor rhombs of iron-bearing carbonate tens of microns in size were identified. Detrital feldspar compositions are being established to test subsequent changes in feldspar composition resulting from progressive burial and albitization. Hydrolysis reactions for authigenic minerals and reactions between key pairs of minerals have been written. Thermodynamic functions for complex phyllosilicates at temperatures up to 200 exp 0 C have been calculated. From thermodynamic calculations it was predicted that ferroan calcite would be the favored authigenic carbonate in shales. (ERA citation 06:021958)

DOE/ET/28388-T1 PC **A02**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Structure of the Presidio Bolson Area, Texas, Interpreted from Gravity Data.
J. R. Mraz, and G. R. Keller. 1980, 23p
Contract AS05-76ET28388

To obtain a better understanding of the structure and tectonism of the region, an integrated geophysical-geological study of the Presidio area, Texas, was undertaken using gravity measurements and deep drilling data. New gravity data were combined with existing data to construct simple Bouguer anomaly maps of the Presidio area, and two-dimensional computer modeling of gravity profiles was used to derive earth models. These data outline the major geologic features of the area that are dominated by the effects of Tertiary block faulting and volcanism. The main feature of interest was the Presidio Graben, which is approximately 1.5 km deep near Ruidosa, Texas. One motivation for this study was the collection of a part of the basic scientific data needed to assess the geothermal potential of the area, and the results obtained support the hypothesis that hot springs associated with the Presidio Graben derive their heat from deep circulation along its boundary faults. However, some gravity anomalies observed could be interpreted as indicating the presence of late Tertiary intrusions that could provide heat for the hot springs. (ERA citation 06:021959)

DP-MS-80-119 PC **A04**/MF **A01**
Indiana Univ. at Bloomington.
Clay Mineralogy of Selected Sediments and Soils at the Savannah River Plant, Aiken, South Carolina.
R. V. Ruhe, and E. A. Matney. 1979, 59p
Contract AC09-76SR00001

Six samples of stream and pond sediments, six soil samples, one sample of sluiced fly ash, and one sample of precipitated coal ash from the Savannah River Plant were selected for clay-mineral studies. Among the sediments and soils, only one sample contained kaolinite, illite, and a 14 A mineral which expanded after glycolation and collapsed after heating. All other sediments and soils contained only kaolinite and a 14 A mineral which did not expand after glycolation and which collapsed progressively toward 10 A at successively higher temperature heating. The percentages of clay minerals were estimated by using the recently developed method of adding increasing proportions of soil clay to a constant standard. All sediments and soils were acidic, had low cation-exchange capacities, and were deficient in extractable bases. They were derived from or were part of Ultisols, which are rather severely weathered soils. The fly and coal ash were essentially composed of minerals of low- and high-temperature quartz and a fired product of alumina-silica (mullite). The x-ray analyses were verified by elemental chemical analyses by using inductively coupled plasma-optical emission spectrometry. (ERA citation 06:022729)

ICTIS/TR-13 PC **A06**/MF **A01**
International Energy Agency Coal Research, London (England).
Geophysical Examination of Coal Deposits.
L. J. Jackson. Apr 81, 116p
U.S. Sales Only.

In recent years, the coal industry has focussed its attention on geophysical techniques in the solution of mining problems and as an aid to mine planning. One important application of geophysics is in the various techniques of geophysical borehole logging. Since there are large contrasts in physical properties between coal and the other rocks normally found in a coal deposit, the responses of the coal seams to logging tools, each measuring a different physical characteristic of the rocks, may be easily recognized on the logging records. Based upon information from the logs, cores for laboratory analysis are only cut from selected sections of the borehole. In addition, information about the density and chemical composition of the coal may be obtained. Another geophysical technique which has been used with great success in coal deposits is seismic surveying. Surface seismic reflection surveys using two-dimensional arrays of seismic sources and detectors have been found in areas of simple geology to be capable of detecting faults with throws as small as 3 m at depths of 800 m. In geologically disturbed areas, good results have been obtained from three-dimensional surveys. Still smaller faults as far as 500 m in advance of the working face may be detected using in-seam seismic surveying conducted from a roadway or working face. Small disturbances have also been detected successfully by pulse radar and continuous wave electromagnetic methods either from within boreholes or from underground. The range of these techniques is at present smaller than that of the seismic techniques. Other geophysical techniques which exploit the electrical, magnetic, gravitational, and geothermal properties of rocks have been found capable of locating abandoned mine shafts and other subsurface cavities at old mining sites and of delineating areas of clinkered rocks. (ERA citation 06:021545)

LBL-12467 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Large-Volume Tests in Rock Mechanics.
D. J. Watkins, and R. K. Thorpe. Apr 81, 14p
CONF-810559-1
Contract W-7405-ENG-48
Conference on properties of materials under extreme conditions, Los Alamos, NM, USA, 18 May 1981.

Few laboratory tests have been performed on rock specimens with principal dimensions in excess of 30 cm. While available data have shown that sample size can have a major influence on measured properties, the magnitude of these effects remains uncertain. Interpretation of laboratory data is further complicated by the effects of sample disturbance, stress relief, and the inability to fully reproduce in situ boundary conditions. In situ methods of testing enable more representative volumes of a rock mass to be studied in a relatively undisturbed state, but are limited by uncertainties of boundary conditions and the inability to reproduce generalized stress conditions. For engineering design, rock mass properties must be estimated by synthesis of data from a variety of laboratory and in situ testing procedures, rock mass classification, and fracture characterization techniques. An experimental program to study the strength and permeability of a 1.0m diameter by 2.0m high specimen of granitic rock provides an example of large volume laboratory tests. This sample failed in unconfined axial stress was increased from zero to 5.56 Mpa, the permeability of the specimen decreased from 5.25cm/sec to 0.5cm/sec, but then increased to some 2.0cm/sec due to shear dilatancy and fracture opening associated with failure of the sample. (ERA citation 06:024422)

PB81-203994
(Order as PB81-203978, PC **A05**/MF **A01**)
Shandong Coll. of Oceanology (China).
A New Classification of Mineral Resources of the Sea,
Erqin Zhu. 14 May 79, 5p
Included in Kexue Tongbao, v25 n2 p168-172 Feb 80.

It has been some 300 years since man began surveying and exploiting subsea mineral resources. In recent years much research and exploration has been done for the extraction of deep sea manganese nodules, and further, the exploitation of the mineral resources of deep ocean floors on a big scale has also been considered. The magmatism of ocean ridge is favorable for mineralization so through many years of marine geological work, there have been found wide spread phenomena of mineralization, numerous outcrops of pay mother rock, rare pay sediment, and non-existent ore deposits of bed rock under ocean floor. The further object in this field will be the prospecting and exploiting of endogenic metallic mineral resources beneath deep ocean floors.

PB81-204240
(Order as PB81-204224, PC **A05**/MF **A01**)
Wuhan Coll. of Geology (China).
A New Mineral - Ashanite (Nb, Ta, U, Fe, Mn)4O8,
Rubo Zhang, Huixin Tian, Zhizhong Peng, Zhesheng Ma, and Fengming Han. 18 Jun 79, 5p
Included in Kexue Tongbao, v25 n6 p510-514 Jun 80.

A new mineral was found in Northwest China in August 1977. It is a rich-niobium end member of the ixiolite series. This new mineral was named ashanite, after the place where it was discovered, the Altai Mountains, 'a' from Altai, 'shan' meaning mountain or mountains in Chinese. The chemical formula of the ashanite is (Nb, Ta, U, Fe, Mn)4O8.

PB81-215634 PC **A03**/MF **A01**
North Carolina Water Resources Research Inst., Raleigh.
A Technique for Evaluating the Hydraulic Conductivity of Saprolite,
Charles W. Welby. Apr 81, 46p UNC-WRRI-81-164, W81-03605, OWRT-A-115-NC(1)
Contract DI-14-34-0001-1135

Increased emphasis on stringent controls of solid/hazardous wastes burial sites and the need in North Carolina for a rapid cost-effective evaluation of potential sites for such purpose required a quick, reasonably accurate method for determining hydraulic conductivity (HC) of saprolite developed on the crystalline rocks of the Piedmont Province. Development of such a method is reported using adapted commercially-available flow meter as a field instrument, tested with artificial standards composed of Portland cement and sand mixtures in various ratios. The standards related instrument-measured air permeability to HC of standard/field samples encased in heat-shrinkable plastic. Saprolites were studied (250 cores) from various rock types.

PB81-220857 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
The Volume of Sand and Gravel Resources in the Lower Bay of New York Harbor,
H. J. Bokuniewicz, and C. T. Fray. Dec 79, 41p
SR-32, REF-79-16, NOAA-81043001

The shallow (less than 100 ft) stratigraphy of the Lower Bay floor was investigated in order to estimate the volume of sand and gravel deposits under the Lower Bay. Four types of information were studied. These were: (1) core and boring logs, (2) seismic reflection profiles, (3) the surficial sediment distribution on the floor of the Lower Bay,

(4) the stratigraphy in Long Island, Staten Island, northern New Jersey, and the New York Bight. In general, marine sands overlie glacial outwash sands which, in turn, overlie unconsolidated Cretaceous sediments. Along the margins of the Bay, sands are known to rest on fine-grained deposits at depth; the composition of layers underlying the surficial sand deposits in the central and eastern Bay is unknown.

SAND-81-7063 PC **A07**/MF **A01**
RE/SPEC, Inc., Rapid City, SD.
Elastic-Plastic Deformation of Anhydrite and Polyhalite as Determined from Quasi-Static Triaxial Compression Tests.
T. W. Pfiefle, and P. E. Senseny. May 81, 130p
Contract AC04-76DP00789

Constant stress-rate triaxial compression experiments were performed on specimens of anhydrite and polyhalite at low confining pressure and at two temperatures. The loading rate was 5.75 x 10 exp -2 MPa s exp -1 ; the confining pressures were 1, 5, 10, and 20 MPa and the two temperatures were 25 exp 0 C and 100 exp 0 C. The specimens were loaded to failure in a soft testing machine so that failure occurred at peak stress. Results from these experiments were used to construct yield envelopes, failure envelopes and stress-strain curves, and to determine mechanical properties. Yield, determined by the onset of dilatancy, occurs at about sixty percent of peak stress. The effect of temperature on both the yield and failure envelopes is negligible. The polyhalite specimens were found to be about twice as strong as the anhydrite specimens. The stress-strain data were fitted to a constitutive law. (ERA citation 06:022731)

8H. Hydrology and Limnology

AD-A100 746/7 PC **A06**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Sediment-Budget Study for the Upper Mississippi River, GREAT-III Reach,
Tatsuaki Nakato. Apr 81, 121p Rept no. IIHR-227

The sediment-budget analysis along the Upper Mississippi River was made using limited field data for the GREAT-II reach between Guttenberg, Iowa and Saverton, Missouri (Pool 11-Pool 22). This analysis resulted in a detailed pool-by-pool estimate of sediment balance, including sediment inputs and outputs on each pool boundary, and average sediment deposition (or scour) or dredging within the pool. (Author)

N81-26530/8 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Development of a Universal Water Signature for the Landsat-3 Multispectral Scanner, Part 1.
Final Report, Jan. - Sep. 1980.
E. H. Schlosser. Sep 80, 27p NASA-CR-161012, LEMSCO-15621-PT-1
Contract NAS9-15800

A generalized four channel hyperplane to discriminate water from nonwater was developed using LANDSAT-3 multispectral scaner (MSS) scenes and matching same/next day color infrared aerial photography. The MSS scenes varied in sun elevation angle from 40 to 58 deg. The 28 matching air photo frames contained over 1400 water bodies larger than one surface acre. A preliminary water discriminant, was used to screen the data and eliminate from further consideration all pixels distant from water in MSS spectral space. A linear discriminant was iteratively fitted to the labelled pixels. This discriminant correctly classified 98.7% of the water pixels and 98.6% of the nonwater pixels. The discriminant detected 91.3% of the 414 water bodies over 10 acres in surface area, and misclassified as water 36 groups of contiguous nonwater pixels.

N81-26531/6 PC **A10**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Development of a Universal Water Signature for the Landsat-3 Multispectral Scanner, Part 2 of 2.
Final Report, Jan. - Sep. 1980.
E. H. Schlosser. Sep 80, 220p NASA-CR-161010, LEMSCO-15621-PT-2
Contract NAS9-5800

A generalized four-channel hyperplane to discriminate water from non-water was developed using LANDSAT-3 multispectral scanner (MSS) scences and matching same/next-day color infrared aerial photography. The MSS scenes over upstate New York, eastern Washington, Montana and Louisiana taken between May and October 1978 varied in Sun elevation angle from 40 to 58 degrees. The 28 matching air photo frames selected for analysis contained over 1400 water bodies larger than one surface acre. A preliminary water discriminant was used to screen the data and eliminate from further consideration all pixels distant from water in MSS spectral space. Approximately 1300 pixels, half of them non-edge water pixels and half non-water pixels spectrally close to water, were labelled. A linear discriminant was iteratively fitted to the labelled pixels, giving more weight to those pixels that were difficult to discriminate. This discriminant correctly classified 98.7 percent of the water pixels and 98.6 percent of the non-water pixels.

PB81-215519 PC **A05**/MF **A01**
Clark Coll., Atlanta, GA. Dept. of Physics.
Hydrogeology of the Buffalo Aquifer, Clay and Wilkin Counties, West-Central Minnesota.
Water-resources investigations,
Ronald J. Wolf. Feb 81, 93p USGS/WRD/WRI-81-041, USGS/WRI-81-4
Prepared in cooperation with Minnesota Dept. of Natural Resources, St. Paul, Clay and Wilkin Counties, and the cities of Moorhead and Sabin.

The Buffalo aquifer is the principal source of ground-water supplies in the Moorhead, Minnesota area. The aquifer is an elongated, narrow deposit of sand and gravel, which locally contains water under confined conditions. Although the Buffalo aquifer contains about 270 billion gallons of water in storage, only 120 billion gallons could be withdrawn. Largest well yields occur along the deep through in the center of the aquifer. Induced streambed infiltration may be possible in certain areas where the stream overlies the aquifer and where the intervening lake sediments are thin or absent. Construction of a numerical model for aquifer evaluation has shown that a considerable amount of ground water is discharged through the confining bed to the stream or leaves the area as underflow to the west.

PB81-215626 PC **A08**/MF **A01**
Idaho Cooperative Fishery Research Unit, Moscow.
Influence of Streamflow Reductions on Salmonid Embryo Development and Fry Quality.
Technical completion rept.,
Dudley W. Reiser, and Robert G. White. Mar 81, 159p W81-03606, OWRT-A-058-IDA(1)
Contract DI-14-34-0001-1218
Prepared in cooperation with Idaho Water and Energy Resources Research Inst., Moscow.

The program was designed to examine effects of streamflow reduction on salmonid embryo incubation success, to determine if extragravel parameters could be adequately related to the intergravel environment, and to develop a methodology for recommending embryo incubation flows. Both field and laboratory tests were conducted from 1977-1979. Reductions in streamflow over redds (chinook salmon and steelhead trout) containing sediment (less than 0.84 mm) in quantities from 3-13% resulted in increased embryo mortality. Incubation flow recommendations based on computations using the U.S. Fish and Wildlife Services Instream Flow Group technique should provide for suitable incubation velocities.

PB81-215675 PC **A04**/MF **A01**
Virginia Water Resources Research Center, Blacksburg.
Rock Type and Minimum 7-Day/10-Year Flow in Virginia Streams,
Rod W. Smith. Apr 81, 52p VPI-VWRRC-BULL-116, OWRT/A-999-VA(23)
Contract OWRT-A-999-VA
Prepared in cooperation with Patton, Harris, Rust and Guy, Bridgewater, VA.

The purpose of this study was to demonstrate an effective method of minimum 7-day/10-year flow (Q) estimation in order to assist proper construction of sewage treatment plants or to estimate safe surface water withdrawals for water systems. A direct comparable relationship was noted between the geologic rock categories studied and their discharge rate during low flow periods as approximated by Q. Streams flowing through unconsolidated sedimentary material, Triassic sandstone, shale and sandstone interbeds, or metavolcanic rock do not have high yields for their drainage area size; those flowing through metamorphosed sedimentary and igneous rock, Lynchburg conglomerates, and carbonate rock show markedly high flow values relative to their basin size. Springs greatly influence Q stream flow through carbonate rock. Q values can be estimated for streams with dissimilar rock types by addition of streamflows for each rock type within the stream drainage area.

PB81-216095 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Coal Liquefaction Demonstration Plant Near Morgantown, West Virginia; Water Assessment Report Section 13(b).
Nov 80, 40p
Prepared in cooperation with Ohio River Basin Commission, Cincinnati. See also PB81-216103.

This report is the result of an assessment of water requirements and water supply availability for a proposed coal liquefaction demonstration project at Fort Martin near Morgantown, WV. It also includes a preliminary assessment of the commercial project as currently planned.

PB81-216103 PC **A02**/MF **A01**
Water Resources Council, Washington, DC.
Coal Liquefaction Demonstration Plant Near Morgantown, West Virgina; Water Assessment Report.
Summary rept.
21 Aug 80, 14p
See also PB81-216095. Prepared in cooperation with Ohio River Basin Commission, Cincinnati.

This assessment report is for public review and comment and was prepared under the provision of Sect. 13(b) of the 1974 Federal Nonnuclear Energy Research and Development Act. It includes only a preliminary assessment of the commercial project as currently planned.

PB81-216111 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Great Plains Gasification Project, Mercer County, North Dakota; Water Assessment Report Section 13(c).
Dec 80, 46p
See also PB81-216129. Prepared in cooperation with Missouri River Basin Study Group.

This report was prepared under the provisions of paragraph (c) of Sect. 13 of the Federal Nonnuclear Energy Research and Development Act of 1974. It assesses (1) the availability of adequate water supplies to meet the water requirement of the project, supporting activities and other development induced by the project and (2) the changes in the water resources that will result from the project.

PB81-216129 PC **A02**/MF **A01**
Water Resources Council, Washington, DC.
Great Plains Gasification Project, Mercer County, North Dakota; Water Assessment Report.
Summary rept.
4 Aug 80, 14p
See also PB81-216111. Prepared in cooperation with Missouri River Basin Commission, Omaha, NE.

This report was for public view and comment. It assesses (1) the availability of adequate water supplies to meet the water requirements of the project, supporting activities and other development induced by the project, and (2) the changes in the water resources that will result from the project.

PB81-216632 PC **A03**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Characterization of Floodflows along the Arkansas River without Regulation by Pueblo Reservoir, Portland to John Martin Reservoir, Southeastern Colorado.
Water-resources investigations (Final),
John R. Little, and Daniel P. Bauer. 1981, 44p USGS/WRI-80-97, USGS/WRD/WRI/81-048
Prepared in cooperation with the Arkansas River Compact Administration and the Southeastern Colorado Water Conservancy District.

The need for a method for estimating flow characteristics of flood hydrographs between Portland, Colorado, and John Martin Reservoir has been prompted with the construction of the Pueblo Reservoir. To meet this need, the U.S. Geological Survey in cooperation with the Southeastern Colorado Water Conservancy District has developed a procedure for predicting floodflow peaks, traveltimes, and volumes at any point along the Arkansas River between Portland and John Martin Reservoir without considering the existing Pueblo Reservoir detention effects. A streamflow-routing model was calibrated initially and then typical flood simulations were made for the 164.8-mile study reach. Simulations were completed for varying magnitudes of floods and antecedent streamflow conditions.

PB81-217077 PC **A12**/MF **A01**
Geological Survey, Columbus, OH. Water Resources Div.
Water Resources Data for Ohio, Water Year 1980. Volume 2. St. Lawrence River Basin.
Water-data rept. (Annual) 1 Oct 79-30 Sep 80.
Apr 81, 268p USGS-WRD-OH-80-2, USGS/WRD/HD-81/038
See also Volume 2, dated 1979, PB81-105397.

Water resources data for the 1980 water year for Ohio consist of records of stage, discharge, and water quality of streams; stage and contents, and water quality of lakes and reservoirs; and water levels and water quality of groundwater wells. This report in two volumes and one appendix contains records for water discharge at 169 gaging stations; stage and contents at 39 lakes and reservoirs; water quality at 57 gaging stations and 83 wells; and water levels at 183 observation wells. Also included are data from 84 crest-stage partial-record stations; 91 low-flow partial-record stations, and 537 coal hydrology synoptic sites. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements and analyses. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Ohio.

PB81-218042 PC **A04**/MF **A01**
Water Resources Council, Washington, DC.
The Nationl Assessment Process--Evaluation and Recommendations,
L. Douglas James, Daniel H. Hoggan, and Dean T. Larson. May 81, 55p

The purpose of this report is to initiate ways to improve future national assessments. The effort is twofold: (1) a short term program to assess specific immediate problem areas of national significance; and (2) a long-range national assessment program carefully designed to address nationwide water policy and management issues.

PB81-219602 PC **A09**/MF **A01**
O'Brien and Gere Engineers, Inc., Syracuse, NY.
Combined Sewer Overflow Abatement Program, Rochester, NY-Volume 1:Abatement Analysis.
Final rept. May 74-Nov 76,
Frank J. Drehwing, Cornelius B. Murphy, David J. Carleo, and Thomas A. Jordan. Jul 81, 178p
EPA-600/2-81-113
Grant EPA-Y005141

Pollution abatement analyses conducted in conjunction with system network modeling studies and supported by combined sewer overflow (CSO) monitoring and sampling were initiated with the ultimate goal of formulating a cohesive and workable Master Plan for CSO reduction and control. Overflow monitoring and sampling data from thirteen CSO locations within the Rochester, New York Pure Waters District Served as the basis for network modeling studies. The receiving water models were used to evaluate various CSO pollution abatement alternatives. Nonstructural, minimal structural, and structural, and structurally intensive alternatives were defined and evaluated by these models.

PB81-219750 PC **A12**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Methods for Assessment of Stream-Related Hazards to Highways and Bridges.
Final rept.,
H. W. Shen, S. A. Schumm, J. D. Nelson, D. O. Doehring, and M. M. Skinner. Mar 81, 256p
FHWA/RD-80/160
Contract DOT-FH-11-9396

River behavior at a highway crossing depends not only on the stability of that particular river reach, but also on the behavior of the entire fluvial system of which it is a part. Rivers are complex landforms. A simple and straight forward approach to the identification of river hazards is not always possible. A complete evaluation of hydraulic hazards cannot be solely based on on-site hydrologic, hydraulic and geomorphic factors; but must also include insight into historic trends, synoptic consideration of basin characteristics, and anticipation of future changes. Streams can be divided into five types based on channel pattern and mode of sediment transport. Each stream type exhibits its own characteristic stability. Detailed evaluation involves consideration of many variables. After evaluating stream variables a list of potential stream hazards can be developed. To assess hydraulic hazards at a crossing it is necessary to understand the past, examine the present, and anticipate the future. Methods such as remote sensing, land use evaluation and slope stability analysis should not be overlooked.

PB81-220121 PC **A04**/MF **A01**
New Hampshire Univ., Durham. Dept. of Civil Engineering.
Dispersion Studies in the Piscataqua River,
Edward Schmidt. Jun 80, 55p UNH-SG-167, NOAA-81050502

A dye tracer study in the lower Piscataqua River, New Hampshire, provided data for calibration of a two-dimensional finite element dispersion model. Approximately 50 pounds of Rhodamine WT dye was released at midchannel and continuous sampling transects were made over a single tidal cycle. Lateral and longitudinal dispersion coefficients were estimated from the measured dye concentration distribution. Recommendations are given regarding future modeling of this river reach.

PB81-221020 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Characteristics of the Ground-Water Seepage into Great South Bay,
Henry J. Bokuniewicz, and Michael J. Zeitlin. Mar 80, 39p SR-35, REF-80-2, NOAA-81042913

The water quality and salinity in Great South Bay represent a balance between the amount of seawater that enters the bay through its inlets and the amount of freshwater that is supplied from Long Island. Streamflow accounts for most of the freshwater supplied to the bay. The second largest contribution is the submarine outflow of ground water across the bay floor. Direct measurements of this source are reported here. This is the first such study of submarine outflow. Preliminary work showed that much of the seepage occurred within 100 meters of the shore. Submarine outfow rates were as high as 150 liters/day/square meter. Variations in the outflow rate due to tidal changes in the water level could not be detected. The flow rate did appear to be sensitive to coastal flooding and rainfall, however. The day after tropical storm David passed Long Island the flow values were measured at one site and found to be nearly double the typical values at that site. In order to calculate the total submarine outflow, the data were described as decreasing exponentially with distance from shore. This calculation suggests that significant amounts of ground water may enter the bay far from shore due to sustained, upward leakage from deep aquifers.

PB81-221384 PC **A03**/MF **A01**
Geological Survey, Lansing, MI. Water Resources Div.
Hydrogeology, Estimated Impact, and Regional Well Monitoring of Effects of Subsurface Wastewater Injection, Tampa Bay Area, Florida,
John J. Hickey. Feb 81, 46p USGS/WRI-80-118, USGS/WRD/WRI-81-052
Prepared in cooperation with Southwest Florida Water Management District, Brooksville.

The potential impact on freshwater resources in the Tampa Bay area from subsurface injection of waste treatment plant effluent at six proposed sites located in Pinellas County, including the city of St. Petersburg, is of some concern. Projected maximum injection rate, when all sites become operational, will be about 40 million gallons per day. The injection zone at the proposed sites is a persistently dolomitized section of the Avon Park Limestone in the lower part of the Floridan aquifer. The injection zone contains ground water with chloride concentration of 19,000 to 20,000 milligrams per liter. Pressure changes and velocity that could result from injection were computed for selected regional locations. Results of model computations suggest that the regional impact during 20 years of injection within the Tampa Bay area will be small.

PB81-223612 PC **A99**/MF **A01**
Geological Survey, Louisville, KY. Water Resources Div.
Water Resources Data for Kentucky, Water Year 1980.
Water-data rept.
Apr 81, 819p USGS/WRD/HD-80/044, USGS-WRD-KY-80-1
See also 1978, PB-296401.

Water resources data for the 1980 water year for Kentucky consist of records of stage, discharge, and water quality of streams; stage and contents of lakes; and water levels and water quality of wells and springs. This report contains discharge records from 116 gaging stations; stage and contents for 15 lakes; suspended-sediment data for 43 stations (28 daily); daily temperature records for 35 stations; daily specific conductance for 24 stations; ground-water level for 74 recording, 85 partial; waterquality data from 232 coal hydrology sites (28 partial, 204 miscellaneous) 3 springs and 311 wells; and miscellaneous temperature and specific conductance from the 116 gaging stations. Also included are data for 123 partial-record crest-stage and 102 partial-record low-flow sites. Data collected at various miscellaneous sites is also published. These data represents that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Kentucky.

PB81-224180 PC **A99**/MF **A01**
Geological Survey, Lansing, MI. Water Resources Div.
Water Resources Data for Michigan, Water Year 1980.
Water-data rept. (Annual) 1 Oct 79-30 Sep 80.
Apr 81, 632p USGS/WRD/HD-80037, USGS-WRD-MI-80-1
See also 1979, PB80-208556.

Water resources data for the 1980 water year for Michigan consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels, water quality, and water temperature of ground-water wells. This report contains discharge records for 180 gaging stations; stage only records for 4 gaging stations; stage and contents for 5 lakes and reservoirs; water quality for 62 continuous-record stations; and water levels for 52 observation wells. Also included are 87 crest-stage partial-record stations and 62 low-flow partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated

by the U.S. Geological Survey and cooperating State and Federal agencies in Michigan.

8I. Mining Engineering

DE81022412 PC **A02**/MF **A01**
Kentucky Univ., Lexington.
Petrographic Characterization of Kentucky Coals. Progress Report (Six Month).
J. C. Hower. 5p DOE/PC/30223-T1
Contract FG22-80PC30223
Microfiche only after original copies are exhausted.

Three projects involve study of the form and association of pyrite in coal, study of the fluorescing macerals in western Kentucky coals, and study of the properties of the semi-inert macerals. The study of the size, form, and microlithotype association of pyrite in western Kentucky coals has shown the greatest progress. The approach to the classification has been to identify the size categories (rather than absolute size), the form (such as framboidal, euhedral, cleat, massive, dendritic), and the organic (microlithotype) association for each of 1000 pyrite grains encountered in the scan of two particulate pellets of a coal (magnification of 625 x). The present study has focused on the Springfield (No. 9) and Herrin (No. 11) coals from the western Kentucky Coal Field. Preliminary results indicate that there is a significant change in the nature of the pyrite from the Webster Syncline mine in the No. 9 coal to the Henderson Basin mine in the No. 9 coal. Changes in the petrography of the coal are also seen and both may be related to changes in the depositional environment of the coal. (ERA citation 06:023046)

DE81023282 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Instrumentation for Real-Time Data Analysis and Control of Synthetic-Fuel Technologies.
R. E. Zielinski, A. K. Agarwal, and P. W. Seabaugh. 1981, 15p MLM-2838(OP), CONF-810607-5
Contract AC04-76DP00053
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.
Microfiche only after original copies are exhausted.

Instrumentation and a sample handling system designed for real-time analysis and control of Underground Coal Gasification Field Test in a 900 foot deep, seven foot thick coal seam worked well in capturing all the data to accurately analyze the process and adequately identify necessary process changes. This instrumentation can be modified for application to other coal conversion processes. It can also be modified to ensure automatic control for process optimization. 11 figures, 2 tables. (ERA citation 06:023035)

DE81023305 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Role of Site Characteristics in the Control of Underground Coal Gasification.
B. E. Bader, and R. E. Glass. 1981, 8p SAND-80-2664C, CONF-810607-7
Contract AC04-76DP00789
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.
Microfiche only after original copies are exhausted.

Underground Coal Gasification (UCG) offers many potential economic and environmental advantages. Offsetting these advantages is the substantial lack of ability to control the UCG process. For example, only three elements of external process control have been utilized. These are: (1) injected gas composition, (2) injected gas flow rate, and (3) product gas pressure. Variation of these independent variables in UCG tests has resulted in mixed indications of their effectiveness. This study indicates other possible elements of control based on the results of recent field tests and modeling efforts. These elements are associated with the selection of the specific site where the process is conducted and with the design of the test itself. The results of previous UCG field tests have indicated that the conditions that exist in the coal seam and overburden before the start of the combustion process may dominate all other factors. These conditions are the geotechnical characteristics, such as faulting and groundwater hydrology, as well as the details of the test layout, well completions, and linking method. Evidence exists to support the thesis that these preignition conditions can be dominant factors in process control of in-situ operations. The data from recent UCG tests have been analyzed with respect to the effect of the site geotechnical characteristics and the test design. The results of this analysis indicate that geologic faulting, coal seam permeability distributions, well completions, and coal strength are important elements of control in the process behavior. Attempts to influence Hanna IVB by varying external process parameters could not overcome these effects. Similar results have been observed in other UCG tests. (ERA citation 06:023037)

DE81023551 PC **A03**/MF **A01**
Arizona Solar Energy Research Commission, Phoenix.
Evaluation of Geothermal Energy in Arizona. Quarterly Topical Progress Report, January 1, 1980-March 31, 1981.
D. H. White, L. A. Goldstone, and L. Malysa. 1981, 32p DOE/RA/50076-T4
Contract FC03-80RA50076
Microfiche only after original copies are exhausted.

The tasks, objectives and completed work are discussed for the legislative and institutional program, cities program, geothermal applications utilization technology, and outreach. The work on the Marysvale Terrace development and the New Mexico Energy Institute are described. (ERA citation 06:023392)

DE81023778 PC **A08**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Progress Review No. 25: Contracts for Field Projects and Supporting Research on Enhanced Oil Recovery and Improved Drilling Technology. Progress Report, Quarter Ending December 31, 1980.
B. Linville. May 81, 160p DOE/BETC-81/1
Microfiche only after original copies are exhausted.

Reports are presented of contracts for field projects and supporting research on chemical flooding, carbon dioxide injection, thermal/heavy oil, as well as for the following areas of research: resource assessment technology; extraction technology; environmental; microbial enhanced oil recovery; improving drilling technology; and general supporting research. (ERA citation 06:023084)

DE81024006 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Effects of Injection Gas Composition on Modified In Situ Shale Retort Economics.
J. W. Barnes. Apr 81, 14p LA-8815-MS
Contract W-7405-EN-36
Microfiche only after original copies are exhausted.

The effects of injection gas composition on the performance and economics of a Modified In Situ oil shale retort have been examined. The injection of air could produce oil at a slightly lower price than steam-air injection. Retort systems using steam-oxygen or carbon dioxide-oxygen are economically unattractive. A system using water and air could be economical if water addition can be controlled. Approximately one-quarter of the energy is produced as a retort off-gas that has a very low heating value. (ERA citation 06:023151)

DE81024011 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Measurement of Formation Characteristics of Western Tight Sands: Project 61031 Special Core Analysis Report.
K. Sampath. May 81, 33p DOE/BC/00042-35
Contract AC19-78BC00042
Microfiche only after original copies are exhausted.

This report describes the Institute of Gas Technology's (IGT) research on tight sandstone cores from four wells. Samples from the Dakota Formation of the San Juan Basin well, Canyon Largo No. 256, were selected for comparison with the unpublished measurements by R.D. Thomas of the Bartlesville Energy Technology Center. The second well is the Mobil PCU F31-13G Well in the Piceance Basin, which is being tested under a Mobil Oil Company Department of Energy (DOE) program. The third well is the Natural Buttes Well (sec. 15, T 10S, R. 24 E.) Uinta Basin. The fourth well is the C-K Geoenergy Well DOE-GC1 (sec. 16, T 17 S., R. 24 E.) Uinta Basin. Permeability to gas was measured as a function of pore pressure, confining pressure, and partial water saturation in an attempt to estimate in-situ permeability of tight sandstones. Permeability to liquid was also measured as a function of net confining pressure, and mercury injection tests were conducted on samples to obtain capillary pressure curves. The permeability of tight sandstones was found to be strongly dependent upon net confining pressure and partial water saturation. Brine permeabilities were found to be lower than gas permeabilities extrapolated to infinite mean pore pressure for the cores studied. Under no confining stress, pore size distributions, measured by mercury injection tests, indicate that the majority of pore entry diameters range from 0.1 to 5 microns. 13 figures, 3 tables. (ERA citation 06:023144)

DE81025015 PC **A10**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Evaluation of CAVIJET Cavitating Jets for Deep-Hole Rock Cutting.
A. F. Conn, V. E. Johnson, Jr., H. L. Liu, and G. S. Frederick. May 81, 207p SAND-81-7067
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

A feasibility study has shown that the CAVIJET cavitating fluid jet method should be capable of successfully augmenting the cutting action of mechanical bits under deep-hole conditions. Increased rock cutting rates by existing cavitating jet nozzles can be anticipated with conventional rig pressures for hole depths of at least 1200 m (4000 ft) and possibly deeper. Improved rates of penetration, based on preliminary laboratory roller bit tests, should be achieved by simply substituting CAVIJET nozzles absorbing equivalent hydraulic power for conventional roller bit nozzles. (ERA citation 06:023400)

DOE/BETC/IC-80/3(V.3) PC **A16**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Enhanced Oil Recovery: Miscible Flooding; Thermal Methods; and Process Implementation. Annual Report, October 1, 1979-September 30, 1980.
B. Linville. 1980, 370p

The individual papers in this volume covering miscible flooding, thermal methods, and process implementation were indexed. (ERA citation 06:023085)

DOE/ET/12366-22 PC **A07**/MF **A01**
Gary Energy Corp., Englewood, CO.
Residual-Oil-Saturation-Technology Test, Bell Creek Field, Montana. Final Report.
Jun 81, 140p
Contract AC03-78ET12366

A field test was conducted of the technology available to measure residual oil saturation following waterflood secondary oil recovery processes. The test was conducted in a new well drilled solely for that purpose, located immediately northwest of the Bell Creek Micellar Polymer Pilot. The area where the test was conducted was originally drilled during 1968, produced by primary until late 1970, and was under line drive waterflood secondary recovery until early 1976, when the area was shut in at waterflood depletion. This report presents the results of tests conducted to determine waterflood residual oil saturation in the Muddy Sandstone reservoir. The engineering techniques used to determine the magnitude and distribution of the remaining oil saturation included both pressure and sidewall cores, conventional well logs (Dual Laterolog - Micro Spherically Focused Log, Dual Induction Log - Spherically Focused Log, Borehole Compensated Sonic Log, Formation Compensated Density-Compensated Neutron Log), Carbon-Oxygen Logs, Dielectric Logs, Nuclear Magnetism Log,

Thermal Decay Time Logs, and a Partitioning Tracer Test. (ERA citation 06:021572)

DOE/ET/27163-1 PC **A03**/MF **A01**
WESTEC Services, Inc., Albuquerque, NM.
Baca Geothermal Demonstration Project. Quarterly Technical Progress Report, April 1-June 30, 1980.
Dec 80, 33p
Contract FC03-78ET27163

Topics covered include progress made in the well and steam production systems, the power plant and transmission systems, and in the project data management program. (ERA citation 06:021970)

DOE/ET/27163-2 PC **A04**/MF **A01**
WESTEC Services, Inc., Albuquerque, NM.
Baca Geothermal Demonstration Project Legal and Regulatory Challenges. First Semi-Annual Report for Period Through June 30, 1980.
S. G. Province, K. M. Walter, and J. Miller. Dec 80, 54p
Contract FC03-78ET27163

The Legal and Regulatory Constraints Reports identify and describe the major legal and institutional constraints associated with the Baca Geothermal Demonstration Project. The impacts of these constraints on the Project in terms of cost, schedule, and technical design are also analyzed. The purpose of these reports is to provide a guide for future geothermal development. (ERA citation 06:021965)

DOE/RA/50076-T3 PC **A08**/MF **A01**
Arizona Solar Energy Research Commission, Phoenix.
Evaluation of Geothermal Energy in Arizona. Arizona Geothermal Planning/Commercialization Team. Quarterly Topical Progress Report, July 1-September 30, 1980.
D. H. White, F. Mancini, L. A. Goldstone, and L. Malysa. 1980, 154p
Contract FC03-80RA50076

Progress is reviewed on the following: area development plans, evaluation of geothermal applications, continued evaluation of geothermal resources, engineering and economic analyses, technical assistance in the state of Arizona, the impact of various growth patterns upon geothermal energy development, and the outreach program. (ERA citation 06:021955)

EGG-1183-1797 PC **A02**/MF **A01**
EG and G, Inc., Las Vegas, NV.
Pulsating-Flow Measurement with an Orifice Flange.
L. M. Bossart. 1981, 7p CONF-810637-1
Contract AC08-76NV01183
11. transducer workshop, Seattle, WA, USA, 2 Jun 1981.

This paper resulted from a measurement problem encountered during instrumentation of a Geothermal air drilling operation on the Baca Ranch in the Jemez Mountains in New Mexico. The problem was how to measure the flow of ammonia water solution injected into the air line. The flow is pulsating as the pressure in the ammonia line fluctuates above and below the pressure in the air line. The pump that develops the pressure in the ammonia line is not a positive displacement pump, therefore, counting pump strokes does not determine the number of gal/min of ammonia flow. The flow was measured using an orifice flange differential pressure technique but, the range of flow measured, exceeded the 4:1 range ability of an orifice. A computer smoothing of the differential pressure and the line pressure together with a scaling factor, determined by the shape of the raw differential pressure, provided a smoothing of the flow data which was checked against the actual flow over a long time period to determine the volume of solution injected into the system per hour. An instantaneous reading of ammonia flow was thereby determined. It showed small variations in corrosion rate measured in the standpipe that may have been caused by a momentary variation in the flow of ammonia solution. (ERA citation 06:021971)

GJBX-136-81(V.1) PC **E10**/MF **$15.10**
High Life Helicopters, Inc., Puyallup, WA.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: Wenatchee, Concrete, Quadrangles (Washington). Final Report.
1981, 73p
Contract AC13-79GJ01692
Includes 64 sheets of 48x reduction microfiche.

An airborne combined radiometric and magnetic survey was performed for the Department of Energy (DOE) over the area covered by the Wenatchee and Concrete, 1:250,000 National Topographic Map Series (NTMS), quadrangle maps. The survey was part of DOE's National Uranium Resource Evaluation (NURE) program. Data were collected by a helicopter equipped with a gamma-ray spectrometer with a large crystal volume, and with a high sensitivity proton precession magnetometer. The radiometric system was calibrated at the Walker Field Calibration pads and the Lake Mead Dynamic Test Range. Data quality was ensured during the survey by daily test flights and equipment checks. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, plotted, and contoured to produce anomaly maps based on the radiometric response of individual geological units. The anomalies were interpreted and an interpretation map produced. Volume I contains a description of the systems used in the survey, a discussion of the calibration of the systems, the data collection procedures, the data processing procedures, the data presentation, the interpretation rationale, and the interpretation methodology. A separate Volume II for each quadrangle contains the data displays and the interpretation results. (ERA citation 06:021634)

GJBX-144(81) PC **A08**/MF **A01**
Stieff Research and Development Co., Inc., Kensington, MD.
Preliminary Study of the Transport and Distribution of Radium, Radon and Their alpha-Emitting Daughters Using Nuclear Emulsions and Polonium-210. Final Report.
L. R. Stieff, I. L. Balkissoon, and F. M. Barbera. Mar 81, 168p
Contract AC13-GJ01664

Semi-quantitative Po-210 measurements were made on near surface soil samples near known uranium ore deposits and on closely related diamond drill cores. The physical distribution of uranium and some of its alpha emitting daughter products in these samples was studied qualitatively using alpha sensitive nuclear emulsions. These nuclear emulsion plates suggest that U-238 and its long lived daughters U-234, Th-230 and Ra-226, deposit on grain surfaces in very low concentrations (U-238 in sub picogram amounts). Concentrations of alpha activity usually associated with discrete uranium were not observed. On the basis of alpha star counts in the emulsion, Ra-226 appears to be more mobile than Rn-222. Measurements of Po-210 provide an indirect means of estimating the number of Rn-222 atoms that have decayed over the last 80 to 100 years. Many Po-210 highs have been observed in the Red Desert (Wyoming) cores; some directly associated with uranium mineralization. Evidence was not found for the predicted Po-210 concentration gradient produced by the decay of mobile, unsupported Rn-222. The Po-210 analyses and microscopic studies suggest that observed Rn-222 and Po-210 surface anomalies may be associated with widely dispersed very low concentrations of Ra-226 or its longer lived parents including uranium which surround the ore as halos or as weak zones of uranium mineralization. The Po-210 sub-surface soil anomaly map from this study was also compared with earlier surface anomaly maps from the same area based on helium, radon by Track-Etch and uranium surveys. Selective chemical leaching experiments undertaken in an effort to enhance the mobile Ra-222/Po-210 signal were not successful. (ERA citation 06:021640)

LA-UR-81-1092 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Acoustic Radiation Patterns for Borehole Sources.
M. Fehler, and C. F. Pearson. 1981, 20p CONF-810379-1
Contract W-7405-ENG-36
Society of Well Log Analyst's annual meeting, Mexico City, Mexico, 20 Mar 1981.

Amplitudes of S and P waves from commercial borehole acoustic logging tools depend on the angle between the borehole axis and the direction of propagation as well as the distance between source and receiver. Knowledge of the angular dependence or radiation pattern, is necessary to properly measure the attenuation of waves traveling between two boreholes. Functional expressions are shown for the S and P-waves amplitudes. Experimental work in relatively homogeneous granite suggests that this relationship adequately describes the radiation pattern for both explosive sources and for acoustic transducers placed in fluid filled boreholes. Using these functional expressions for the S and P-wave amplitudes a technique was developed to estimate Q, the quality factor, and locate discrete fractures in crystalline rock that compose the Hot Dry Rock Geothermal Reservoir at Fenton Hill, New Mexico. (ERA citation 06:021961)

LA-UR-81-1430 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
When the Hole Is Dry: The HDR Alternative in the Cascades.
B. Arney, D. Brown, and R. Potter. 1981, 5p
CONF-810572-1
Contract W-7405-ENG-36
Geothermal Resources Council symposium, Portland, OR, USA, 19 May 1981.

The Hot Dry Rock (HDR) method of heat extraction was developed by Los Alamos in silicic plutonic-metamorphic rocks of Precambrian age. Now that the method and mechanisms are better understood, other rock types are under consideration as potential HDR reservoirs. High heat flow over much of the Northwest indicates the potential for geothermal power and heat is great if ways to develop it could be found. Currently two conceptual models for HDR development in volcanic rocks are under development. Experiments planned for this summer should indicate how the rocks behave and how this behavior compares to existing models. (ERA citation 06:021972)

LA-UR-81-1454 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Seasat Satellite Investigation of the Structure of Western Nebraska and Its Application to the Evaluation of Geothermal Resources.
J. Stix. 1981, 20p CONF-810557-1
Contract W-7405-ENG-36
International symposium of remote sensing of environment, Ann Arbor, MI, USA, 11 May 1981.

Seasat synthetic aperture radar (SAR) satellite imagery was used to interpret the structural framework and, indirectly, the geothermal potential of an area in western Nebraska. Lineaments were mapped from the imagery and then compared to known structure. It was found that Seasat does record surface manifestations of subtle basement structures, particularly faulting. Furthermore, four areas with geothermal potential were delineated using Seasat and other data. It is stressed that more subsurface geology and geophysical data are needed before a final evaluation of the geothermal potential can be made. Seasat imagery is a useful reconnaissance exploration tool in the interpretation of regional structure within areas of little topographic relief. (ERA citation 06:023389)

LA-UR-81-1619 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
New NMR Well Logging/Fracture Mapping Technique with Possible Application of SQUID NMR Detection.
J. A. Jackson. 1981, 6p CONF-810660-2
Contract W-7405-ENG-36
SQUID applications to geophysics workshop, Los Alamos, NM, USA, 2 Jun 1981.

A new method for making NMR measurements has been developed that potentially can receive NMR signals from a precise distance into the geologic formation. It is based on the production of a toroidal region of homogeneous radial magnetic field near the mid-plane between two magnets arranged axially so their fields oppose between them. NMR signals have been detected from such

a region in the laboratory. Preliminary data have been extrapolated to the projected performance of a logging tool using superconducting magnets. The presence of cryogenic temperatures required for these magnets may make signal detection using SQUIDs a logical consideration. Preliminary comparison of normal and SQUID NMR detection shows that near the borehole (<18 in.) standard NMR detection is probably superior; at greater distances SQUID detection may be advantageous. Directional detection of the signal may allow fractures near the wellbore to be mapped. Use of SQUID detection may be useful for this application. (ERA citation 06:024108)

LA-UR-81-1620 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Characterization of Hot Dry Rock Geothermal Energy Extraction Systems.
J. N. Albright, and C. A. Newton. 1981, 7p
CONF-810660-1
Contract W-7405-ENG-36
SQUID applications to geophysics workshop, Los Alamos, NM, USA, 2 Jun 1981.

The engineering of heat exchange systems by which geothermal heat can be efficiently extracted from hot impermeable rocks is studied. The system currently under investigation at Fenton Hill, New Mexico consists of a network of large fractures created through the hydraulic pressurization of a well penetrating hot basement rocks and subsequently intersected by a second well drilled to form a flow-thru system. Cool water pumped into the fractures through one well, once heated in the reservoir, returns to the surface through the second well, is cooled, and then recirculated. While much is known about the performance parameters of the fracture network from short-term flow tests, little is understood concerning the spatial dimensions and geometrical relationship of individual fractures comprising the network. Ultimately, the success one has in estimating the long-term performance of such a system where commercialization is an issue, and in engineering future systems with optimal performance, depends on the success in characterizing the flow-thru fracture networks. To date only nonconventional application of oil field logging techniques and acoustic emissions studies have been used in the characterization of the fracture network. (ERA citation 06:023398)

LBL-11940 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Identification of Geothermal Reserves and Estimation of Their Value.
J. H. Howard. Dec 80, 12p CONF-801233-9
Contract W-7405-ENG-48
Annual workshop on geothermal reservoir engineering, Stanford, CA, USA, 16 Dec 1980.

A procedure, is discussed for estimating the value of a hot water geothermal property from a resource owner's point of view. Two methods make up the procedure: a conservative method of estimation and an optimistic one. Value of a property by both methods is estimated to equal the present value of future income less the cost of resource extraction. The two methods share a common set of assumptions (e.g., that the price of hot water at the start of cash flow from a project will be the same). However, the methods differ in important ways. The optimistic method, for example, allows for future increase in price that in turn offsets discounting of future income. Together the methods define a range of values that might reasonably be assigned to a property. (ERA citation 06:021967)

LBL-12175 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Reinjection Studies of Vapor-Dominated Systems.
R. C. Schroeder, M. J. O'Sullivan, K. Pruess, R. Celati, and C. Ruffilli. Oct 80, 74p CONF-801098-3
Contract W-7405-ENG-48
DOE-ENEL workshop for cooperative research in geothermal energy, Berkeley, CA, USA, 20 Oct 1980.

The basic physical phenomena associated with geothermal injection are reviewed; problems associated with its numerical simulation are discussed; and the results of some numerical studies are presented. The particular problems chosen for study are: injection of cold water into a thin (single layer) reservoir; a five-spot production/injection configuration in a thin (single layer) reservoir; injection of cold water into a thick (multi-layer) reservoir; and injection of cold water into a one-dimensonal vertical column, representing a cross section of Larderello geothermal reservoir. (ERA citation 06:021968)

METC/EGSP-14 PC **A02**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Stratigraphic Cross Section of the Upper Devonian Perrysburg and Java Formations and Thier Equivalents, Northwestern Pennsylvania.
J. A. Harper, and K. D. Abel. 1981, 25p
Contract AS21-76MC05198

No abstract available.

PAT-APPL-6-213 446 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Multilayer Pressure Vent for Explosion Proof Enclosures.
Patent Application,
Robert J. Gunderman, and Michael W. Riley.
Filed 5 Dec 80, 12p PB81-222630, DOCKET/MIN-3014
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes a pressure vent for an explosion proof container. The vent allows a high flow rate of gases to pass from the container while arresting flames and cooling exiting hot gases therein. This precludes the build-up of high peak pressures inside the container. Structurally the vent has a protective cover mounted to the container by a knife hinge on one side and closed by imbedded magnets on the opposite side. In addition, the vent has multilayered material mounted in the same container opening near the interior of the container. A layer of porous stainless steel foam with multiple layers of stainless steel screen is used for this vital multilayered material. The optimum embodiment is obtained by preselecting a relationship between the free space volume inside the enclosed container, the number of layers in the prefilter section of the vent, and the cross sectional area of the vent.

PB81-212516 PC **A03**/MF **A01**
Bureau of Land Management, Billings, MT. EMRIA Program.
Resource and Potential Reclamation Evaluation of Beulah Trench Study Area, West Renners Cove Coalfield, Mercer County, North Dakota: ERMIA (Energy Mineral Rehabilitation Inventory and Analysis) Report No. 10, 1977.
Summary rept. (Final) 1977-81.
May 81, 27p BLM-YA-PT-002-7330
Prepared in cooperation with Water and Power Resources Service, Billings, MT., and Geological Survey, Reston, VA. See also PB81-212524.

This multidisciplinary effort was conducted in order to provide information for establishing reclamation objectives and lease requirements should coal development occur in the Beulah Trench study area. Beulah Trench is located in the West Renners Cove coal field, Mercer County, North Dakota. All coal in the study area is Federally owned. All surface is privately owned. Information is provided on geology, coal resources, overburden (soil and bedrock), greenhouse, vegetation, hydrology, climate, and physiography. Most resources were found to have good reclamation potential. Leasing recommendations are made for those resources which could experience adverse impacts from mining.

PB81-212524 PC **A12**/MF **A01**
Bureau of Land Management, Billings, MT. EMRIA Program.
Resource and Potential Reclamation Evaluation of Beulah Trench Study Area, Mercer County, North Dakota: EMRIA (Energy Mineral Rehabilitation Inventory and Analysis) Report No. 10, 1977.
Final rept. 1977-81.
May 81, 275p BLM-YA-PT-81-001-7330
Prepared in cooperation with Water and Power Resources Service, Billings, MT., and Geological Survey, Reston, VA. See also PB81-212516.

This multidisciplinary effort was conducted to provide information for use in establishing reclamation objectives and lease requirements should coal development occur. Beulah Trench study area is located in West Renners Cove coal field, Mercer County, North Dakota. All coal in the study area is Federally owned; all surface is privately owned. Detailed data is given on geology, coal resources, overburden (soil and bedrock), greenhouse, vegetation, and hydrology. Less detailed information is given on climate and physiography.

PB81-214355 PC **A03**/MF **A01**
Blake (Wilson), Hayden Lake, ID.
Wallrock Reactions to Mining Beyond a Preconditioned Zone at the Star Mine, Burke, Idaho.
Final rept. 23 Mar 78-23 Mar 79,
Wilson Blake. Apr 80, 45p BUMINES-OFR-52-81
Contract H0262039

Rock preconditioning in advance of mining has been an effective means of rock-burst control based on the results of field demonstrations carried out on the 7700 level of the Hecla Mining Co.'s Star mine. Mining through the preconditioned zone was characterized by greatly reduced rates of released seismic energy and no bumping or rock bursting occurred within the preconditioned zone. Mining above the preconditioned zone was characterized by greatly increased rates of released seismic energy and rock bursting, particularly where the vein became very narrow in waste zones. This increased incidence of rock bursting points out the need for stope preconditioning to be carried out on an entire stope block basis.

PB81-214827 PC **A03**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Labs.
Direct Calcination of AlCl3.6H2O with Off-Gas Use for Crystallization.
Contract research rept. 26 Jul 78-12 Jan 79 (Final),
L. Keith Hudson, and Jamie K. Carnevale. 12 Jan 79, 30p BUMINES-OFR-62-81
Contract J0188096

This report describes the results of a study to provide data that would demonstrate the decomposition of aluminum chloride hexahydrate using the Alcoa flash calciner design, and to show that hydrogen chloride in the off-gas from the calciner could be absorbed into process solutions to effect crystallization of aluminum chloride hexahydrate.

PB81-214835 PC **A04**/MF **A01**
Morrison-Knudsen Co., Inc., Boise, ID.
Evaluation, Modification and Application of Roadheaders in Underground Uranium Mines.
Contract research Sep 78-Sep 80,
J. P. Connell, C. M. Gibbs, C. L. Livesay, D. C. Myntti, and J. M. Taipale. Sep 80, 74p BuMines-OFR-64-81
Contract DI-H0282024

This study evaluates the use of roadheaders in underground mining operations. The report identifies roadheader operating problems and offers suggestions for improved mechanical and electrical design along with manufacturer and owner responsibilities for improved availability. The development of a complex integrated excavation and ground support system is not warranted until the roadheader itself is made much more reliable.

PB81-214884 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Analysis of Fire Data, Large-Scale Tests, and Small-Scale Tests for Conveyor Belts Used in Underground Coal Mines.
Final rept.,
Emil Braun, Robert E. Meade, and Lee R. Smith. May 81, 106p NSBIR-81-2256
Sponsored in part by Bureau of Mines, Pittsburgh, PA. and Mine Safety and Health Administration, Triadelphia, WV.

An investigation into the requirements and fire test performance of conveyor belts intended for use in underground coal mines was conduted. The aim of this study was to develop recommendations for the Mine Safety and Health Administration (MSHA) on a test method suitable for measuring the fire hazard potential of a conveyor belt in a coal mine environment. A review of incident data, large-scale tests, and small-scale tests was conducted to provide the necessary information. The incident data was analyzed with the goal of developing scenarios that could form the basis for a suitable test to evaluate the appropiateness of the existing test. Large-scale tests were reviewed to determine anticipated belt fire performance under 'realistic' end-use conditions. The tests showed how geometry, input energy, and ventilation controlled belt fire performance. Small-scale tests were used to provide information on specific fire properties such as ease of ignition, flame spread, and smoke generating potential.

PB81-214983 PC **A03**/MF **A01**
Blake (Wilson), Hayden Lake, ID.
Preconditioning an Entire Stope Block for Rock Burst Control.
Final rept. 23 Mar 79-23 Mar 80,
Wilson Blake. May 80, 33p BUMINES-OFR-51-81
Contract J0295080

Rock preconditioning in advance of mining has been an effective means of rock-burst control based on small-scale field demonstrations. The objective of this investigation was to test the effectiveness of rock preconditioning on a larger scale and to determine whether the preconditioning would be effective over a specific period of time. Preconditioning in 8 and 12 crosscuts on the 7900 level of the Hecla Mining Co.'s Star mine involved about 7,232 feet of drilling and the blasting of about 10,055 pounds of high explosives to precondition a block of ground along the main vein of about 450 feet long, 50 feet above and 40 feet below the level. The slight amount of seismic energy accompanying the initial raiseup in the preconditioned stopes indicates that this preconditioning was successful. Continued monitoring should be carried out to determine whether the preconditioning remains effective over the length of time required for the completion of mining in a stope block.

PB81-215329 PC **A12**/MF **A01**
Polhemus Navigation Sciences, Inc., Essex Junction, VT.
Electromagnetic Retransmission System for Locating Trapped Mine Workers.
Open file rept. (Final) Aug 78-Dec 79,
Frederick H. Raab, and Per Krogh Hansen. Feb 80, 268p BUMINES-OFR-48-81
Contract H0188071

The electromagnetic retransmission system is a new, automated method of locating trapped mine workers. This technique overcomes many limitations inherent in electromagnetic direction finding by reducing the effects of the conducting ground to an acceptable maximum, by finding position accurately in the presence of antenna tilt, and by eliminating the need for the receiver to be located directly above the subsurface transmitter.

PB81-215394 PC **A12**/MF **A01**
Wyle Labs., Huntsville, AL.
An Investigation of the Mechanics and Noise Associated with Coal Cutting.
Open file rept. Sep 77-Jun 80,
Robert S. Becker, and Granville R. Anderson, II. 15 Feb 80, 275p WR-80-7, BUMINES-OFR-60-81
Contract J0177060

The results of a laboratory investigation of coal cutting mechanics and noise are presented. The experiments were performed using a linear cutting apparatus that operates over a broad cutting speed range. The influence of several coal cutting parameters on the noise, force, productivity, and specific energy associated with linear cuts was ascertained. Some basic theoretical aspects of coal cutting mechanics and noise generation are discussed, and the results of the laboratory experiments are used to formulate analytical models of the coal forces and noise.

PB81-217002 PC **A08**/MF **A01**
Woodward Associates, Inc., San Diego, CA.
Survey of Attractive Energy Storage and Power Averaging Concepts Applicable to Mining Machines.
Open file rept. 28 Sep 78-31 Jul 80,
William N. Patterson, Leslie Travis, Lawrence Owens, Eduardo Ferreras, and Gary Gavan. 31 Jul 80, 154p BUMINES-OFR-53-81
Contract JO285041

Drive systems for mining machines are usually sized to accommodate anticipated peak loads. Usually, the average power requirements are considerably less. Energy storage and power averaging are attractive concepts for mining machinery and could have far-reaching implications. The purpose of this program was to identify truly feasibile concepts; identify advantages and/or disadvantages, limitations, and constraints; evaluate feasibility based on today's technology; identify anticipated safety problems; and provide the designer with a comprehensive literature base. Concepts evaluated include flywheels, high energy batteries, gas-charged accumulators, inductive storage, capacitive storage, springs and counterweights, thermal, closed cycles, internal combustion engines, and trolley and hybrid systems. A comprehensive index is provided, and an appendix is included containing abstracts of the pertinent literature.

PB81-221905 PC **A06**/MF **A01**
Mathtech, Inc., Princeton, NJ.
Selective Interburden Handling Techniques Volume I - Summary.
Contract research (Final), 27 Sep 78-29 Aug 80,
Robert L. Lappi, and George M. Smrikarov. Sep 80, 125p BUMINES-OFR-80(1)-81
Contract J0285025

Eight interburden handling concepts are developed for multiple seam area mine stripping operations in central and western United States. They are based on data gathered and analyzed during field surveys, literature reviews, and visits to State regulatory agencies in five States. It is concluded that improvement of reclamation practices through selective interburden handling techniques is possible at lower operating costs than currently incurred. Specific multiple seam mining systems are discussed in this report.

PB81-221913 PC **A14**/MF **A01**
Mathtech, Inc., Princeton, NJ.
Selective Interburden Handling Techniques Volume 2 - Appendices.
Contract research (Final), 27 Sep 78-29 Aug 80,
Robert L. Lappi, and George M. Smrikarov. Sep 80, 321p BUMINES-OFR-80(2)-81
Contract DI-J0285025

A summary of the major findings of the literature survey for interburden handling concepts are presented. Literature pertaining to mine practices in multiseam strip mining operations were reviewed. The survey covered two coal regions: the Western coal region with emphasis on the Northern Great Plains coal province and the Interior Central coal region with emphasis on the tri-State area of Illinois, Indiana, and west Kentucky. Previous works on multiseam mining and selective handling techniques were identified and evaluated. The effects of the current proposed State and Federal surface mining laws on alternative interburden handling techniques employed in the Western and Central coal regions are discussed.

PB81-221996 PC **A03**/MF **A01**
Browning Engineering Corp., Hanover, NH.
Silencing the Flame Channelling Process. Volume I.
Open file rept. (Final) 29 Jun 78-31 Jan 80,
James A. Browning. 27 Feb 80, 33p BUMINES-OFR-90-81
Contract H0387017

Conventional flame channeling operates continuously at over 120 db--flame drill channeling operates at a maximum of 95 db. The latter process was developed under this program. Individual drill holes are spaced to leave narrow rock webs. Sound and dust passing from the holes are effectively treated by a muffler and water injection.

PB81-222291 PC **A06**/MF **A01**
TRW, Inc., McLean, VA.
Gas Recovery from Coal Deposits.
Final rept.,
A. A. Lee, C. R. Skillern, and D. R. Watkins. Jan 81, 113p GRI-80/0033
Contract GRI-5011-321-0101

The objective of this project was to assess the production potential of coalbeds at depth below 2500 feet and to determine the effectiveness of hydraulic fracturing in deep coalbeds. Two deep tests were performed, one in the Greater Green River Area and one in the Piceance Basin, both in Colorado.

PB81-222358 PC **A05**/MF **A01**
Management Science Associates, Los Altos, CA.
A Model for the Determination of Flyrock Range as a Function of Shot Conditions.
Final rept. 22 Jul 78-16 Apr 79,
Julius Roth. 16 Apr 79, 97p BUMINES-OFR-77-81
Contract DI-J0387242

Flyrock is the source of most of the injuries and property damage in a majority of blasting accidents in surface mines. A quantitative correlation between shot conditions and maximum flyrock range can be used to define a blasting area in which no personnel or equipment should be present during a shot. The approach used was to develop a model that correlates shot conditions and initial flyrock velocities and permits computation of flyrock range from ballistic trajectories. The Gurney formula for velocity of explosively propelled plates or fragments was adapted to explosively propelled flyrock from vertical rock faces or from bench tops. The modified Gurney formula was then calibrated with measured flyrock velocities from mining and explosives literature. Charts were then developed for possible field use that gives maximum flyrock range as a function of shot conditions.

PB81-223331 PC **A07**/MF **A01**
Dow Chemical Co., Midland, MI.
Development and Evaluation of Polymer Modified Portland Cement Concrete Lagging for Mine Openings.
Open file rept. (Final) 17 Jun 76-31 Dec 78,
R. Douglas Eash, and Henry W. Kirchner. 1 Oct 80, 127p BUMINES-OFR-93-81
Contract H0262046

This report presents results of a study to develop and test a Saran latex modified portland cement concrete lagging to be used as a replacement for wood lagging in underground mining. Two hundred and twenty latex modified concrete lagging were produced and shipped to the Bunker Hill Co. in Kellogg, Idaho, for installation in their mine at the 17th level. The lagging are performing satisfactory after 22 months of exposure in the mine. The Dow concept replaces wood systems by using reinforced latex concrete which outperforms and outlives wood systems, is more cost effective, and is complete nonflammable.

PB81-223380 PC **A03**/MF **A01**
MB Associates, San Ramon, CA.
Application of Weathering Protection at the Face.
Open file rept. (Final), Jul 77-Jan 80,
David C. McHuron. 19 Aug 80, 50p BUMINES-OFR-71-81
Contract H0272008

Many underground coal mines are composed of shale layered directly over the coal that weathers severely immediately after exposure to the mine atmosphere. Condensation of ventilating air causes underground coal mines to become wet during warm months; during cool months, the mines become dry from evaporation. The fluctuating mine atmosphere is responsible for the severe shale break-up experienced during the summer and the lessening of the break-up through the winter months. The objective of this investigation was to design and construct spray equipment to be mounted on a continuous miner for sealing the mine roof immediately after exposure. Selection of the sealant material and a field evaluation of the equipment is included.

PB81-223406 PC **A15**/MF **A01**
Woodward Associates, Inc., San Diego, CA.

Development and Demonstration of Improved Truck Ladders.
Open file rept. (Final), 24 Oct 77-24 Jul 79,
G. Gavin, P. Mate, D. Strassel, and K. Conway.
28 Sep 79, 335p BUMINES-OFR-87-81
Contract H0282001

Analysis of reported injuries for off-highway haul trucks indicated that 42.7 pct were slip and fall, and of these, 34.1 pct occurred mounting or dismounting the machine. Redesign of the lower steps was concluded to provide the most overall improvement for increased safety and accident reduction. Various existing, innovative, and conceptual designs were reviewed and evaluated. The most promising designs were the four-spring-supported lower steps and the center-tube-mounted lower steps. Both steps proved to be viable designs by passing human factors and survivability tests conducted at a large copper mine.

PB81-223414 PC **A99**/MF **A01**
International Mining Consultants, Inc., Broomfield, CO.
Hazardous Surface Openings to Abandoned Underground Mine - Nevada.
Open file rept. (Final) Sep 79-Apr 80,
W. G. Freeman, R. M. Jones, J. G. Babcock, M. L. Christo, and R. A. Noel. Jun 80, 748p
BUMINES-OFR-85-81
Contract J0295039

The purpose of this study was to gather representative sampling of underground mines in various counties in the State of Nevada and to determine which of these mines had openings representing a hazard or threat to the general public. Based on the selection of 157 target mining districts, 200 inactive mines were selected and visited as a representative sample. The sample was categorized and listings were made by county, type of opening, degree of risk associated with the opening, and the closure method recommended. Each mine site was photographed and the name, location, commodity, historical and geologic value, future mining potential, and to closure of inactive mines were researched and summarized. It was concluded that permanent mine closure is seldom desirable; low cost, easily installed closures of a semipermanent-to-temporary variety are most appropriate; and sufficient legal mechanisms exist to protect the public if and when applied.

PB81-872590 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Offshore Structures for Oil and Gas Operations. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 80p

This bibliography covers the design, fabrication or construction, installation or positioning, operation, and hydrodynamic aspects of offshore structures for oil and gas operations. While most attention is given to offshore platforms, some consideration is given to offshore transport terminals and storage facilities and to artificial islands. Coverage is worldwide. (Contains 77 citations fully indexed and including a title list.)

SAND-81-0196 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Development and Testing of FIDELE: a Computer Code for Finite-Difference Solution to Harmonic Magnetic-Dipole Excitation of an Azimuthally Symmetric Horizontally and Radially Layered Earth.
C. N. Vittitoe. Apr 81, 59p
Contract AC04-76DP00789

The FORTRAN IV computer code FIDELE simulates the high-frequency electrical logging of a well in which induction and receiving coils are mounted in an instrument sonde immersed in a drilling fluid. The fluid invades layers of surrounding rock in an azimuthally symmetric pattern, superimposing radial layering upon the horizonally layered earth. Maxwell's equations are reduced to a second-order elliptic differential equation for the azimuthal electric-field intensity. The equation is solved at each spatial position where the complex dielectric constant, magnetic permeability, and electrical conductivity have been assigned. Receiver response is given as the complex open-circuit voltage on receiver coils. The logging operation is simulated by a succession of such solutions as the sonde traverses the borehole. Test problems verify consistency with available results for simple geometries. The code's main advantage is its treatment of a two-dimensional earth; its chief disadvantage is the large computer time required for typical problems. Possible code improvements are noted. Use of the computer code is outlined, and tests of most code features are presented. (ERA citation 06:022521)

SAND-81-0225 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Direct Observation of a Sand-Propped Hydraulic Fracture.
N. R. Warpinski, L. D. Tyler, W. C. Vollendorf, and D. A. Northrop. May 81, 65p
Contract AC04-76DP00789

An experiement has been conducted in which a sand-propped hydraulic fracture is created and then mined back to observe fracture behavior and proppant distribution. Three stages of different colored, different concentration sand transported by a water-based gel were injected into a volcanic ash fall tuff formation at a depth of 1400 ft near an existing tunnel complex. The resultant fracture was subsequently mined back for direct observation and photographed and mapped. This particular region was highly faulted and exhibited significant changes in in situ stress magnitudes across the faults; it is felt that this stress distribution resulted in very complex fracture behavior and growth processes. The fracture was bounded on one wing by a fault which was only a few feet from the wellbore. The fracture terminated on top at an unbonded bedding plane. Most of the injected volume of sand and fluid was forced downward, considerably below the elevation where the fracture was initiated. The different colors of sand were randomly distributed, although they were usually found in distinct layers, but this may have been due to the complex growth process. At different locations the fracture was found to have considerable variations in width; from several sand grains wide (1 cm) to devoid of sand altogether (2 to 3 mm average). (ERA citation 06:021603)

SAND-81-0703 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Transient Stress Analysis of High-Energy Gas-Fracture Experiments.
E. P. Chen. May 81, 22p
Contract AC04-76DP00789

The elastodynamic solution of a cylindrical hole whose edge is subjected to the action of a transient pulse load was obtained in this report. This problem is of interest to the high energy gas fracture experiments to be conducted at the Nevada Test Site. Laplace transform technique is used to present the result in integral forms. Numerical results have been obtained and are presented in graphical forms. (ERA citation 06:021604)

SAND-81-1038 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Oil Shale Program. Twentieth Quarterly Report, October 1980-December 1980.
B. E. Bader. May 81, 62p
Contract AC04-76DP00789

In this report, Sandia in-house activities and field activities (at the Geokinetics Oil Shale Project and the Occidental Oil Shale Project) are described under the headings: bed preparation, bed characterization and evaluation, report characterization and evaluation, and mine stability. (ERA citation 06:021610)

SAND-81-7066 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Program for the Improvement of Downhole Drilling Motor Bearings and Seals. Phase IV. Final Report.
G. A. Tibbets, P. H. DeLafosse, A. Black, and S. J. Green. Apr 81, 95p
Contract AC04-76DP00789

Test results are presented from the seal test machine and bearing-seal package. An overal program summary is given and the major milestones of this phase of the program are shown. (ERA citation 06:021973)

UCRL-85331(Rev.1) PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Direct Observation of Explosively Induced Damage in Sandstone with Application to Reservoir Stimulation.
W. B. Durham. 1981, 10p CONF-810410-4(Rev.1)
Contract W-7405-ENG-48
Scanning electron microscopy conference, Dallas, TX, USA, 14 Apr 1981.

Samples of a porous, partially saturated, loosely consolidated, gas-bearing greywacke sandstone which had been subjected to explosive loading in the laboratory at three effective confining pressures, 0, 24, and 48 MPa, were observed by scanning electron microscopy. Qualitatively, damage decreased with increasing distance to the shot point. Damage was evident as fracturing and compaction in a zone within 10 mm of the explosion point, and as fracturing without significant volume change to a radius of 20 to 30 mm. An attempt to quantify the relationship between damage and distance for the purpose of verifying modeling predictions produced very imprecise results. Clay particles, chiefly kaolinite, which pervade pre-existing cracks and pores are displaced by the explosion but individually are deformed very little. The clays appear to have the ability to blunt crack tips. Microfractures are typically less than 100 mu m long (one grain diameter or less) and none is longer than 300 mu m. The absence of long fractures suggests that reservoir stimulation by explosive loading in this material does not appear promising. (ERA citation 06:021605)

UCRL-85845 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Ultrasonic Thermometry in Oil Shale Retorts.
J. J. Ronchetto. 6 May 81, 12p CONF-810607-1
Contract W-7405-ENG-48
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.

The method relies on the principles of ultrasonic reflectometry to locate and determine temperatures within zones of a slender-rod-sensing element installed in the in-situ retort bed. The measurement technique consists of sending an ultrasonic pulse down an element containing n zones spaced along its length. The zone boundaries are defined by $n + 1$ discontinuities within the element. The time intervals between pairs of returning echoes, caused by reflections from these discontinuities, are measured electronically. These measured time intervals are then related to the average temperature of the corresponding zones. Preliminary results are encouraging, and it appears that the ultrasonic thermometer can be a useful in situ instrument. (ERA citation 06:021612)

8J. Physical Oceanography

AD-A100 647/7 PC **A02**/MF **A01**
Shemdin (Omah H.), La Canada, CA.
Coordination of Marine Remote Sensing Activities with Special Emphasis on MARSEN.
Final rept. 15 Aug-15 Oct 79.
31 Mar 80, 5p
Contract N00014-78-C-0438

Rapid developments in application of remote sensing techniques to oceanography came about because of the Seasat-1 initiative, the first oceanographic satellite designed to demonstrate such proof of concept. Simultaneous with and complementary to the Seasat objective, large-scale experiments were conducted to provide insight on the interaction between electromagnetic waves and the ocean surface. The Marineland and West Cost Experiments were the forerunners of such experiments. MARSEN was conducted during 15 August - 15 October, 1979 as the third of such large scale experiments. The present effort was staged to provide communication between and coordination of the various elements involved in the

MARSEN field operations. The careful and advance planning for the MARSEN Experiment achieved unprecedented success in soliciting financial support for this complex experiment. The experiment was successfully executed according to the MARSEN Test Plan. It is estimated that 90 - 95% of all data sought after was acquired. The extensive data sets and research topics are summarized in a Data Analysis Plan which will serve as a guide for the data analysis phase until the results are reported in the technical journals.

AD-A100 675/8 PC **A02**/MF **A01**
Amherst Coll., MA.
Solubilities of Dissolved Gases in Sea Water.
Final technical rept.,
Bruce B. Benson, and Daniel Krause, Jr. 18 Nov 80, 14p
Contract N00014-78-C-0198

This final technical report is composed of two reprints plus a discussion of other work that is now in preparation for publication.

AD-A100 681/6 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Mass-Transport Processes on Amazon Cone: Western Equatorial Atlantic.
Journal article,
John E. Damuth, and Robert W. Embley. 19 Jun 80, 17p Rept no. LDGO-3130
Contract N00014-75-C-0210, Grant NSF-IDO72-06426
Pub. in American Association of Petroleum Geologists Bulletin, v65 n4 p629-643 Apr 81.

No abstract available.

AD-A100 786/3 MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Oceanographic Observations in the Indian Ocean, March 1978. A Chemical Survey by Marine Environment Group.
Russell W. Pettis, and Daniel J. Whelan. Sep 80, 82p Rept no. MRL-R-792
Availability: Microfiche copies only.

Chemical and physicochemical data on water samples taken at depths down to 4000 metres from eleven stations in the South-East Indian Ocean in March 1978 have been compiled. Samples from each station were analysed for variations with depth of temperature, salinity, pH and alkalinity, dissolved oxygen, metal ions and nutrients. From this material, comments have been made about certain parameters in sea water which may have long-term operational significance, viz. sound speed at various depths, the location of the deep ocean sound channel axis, the absorption of sound in sea water and the nature of the chemical environment at these stations. (Author)

AD-A100 873/9 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
Workshop on Remote Measurement of Underwater Parameters,
Erik Mollo-Christensen. 1981, 2p
Availability: Pub. in EOS, v62 n21 p514-515, 26 May 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 874/7 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
Oceanographic Satellite Data User's Workshop, 14-15 October 1980, Madison, Wisconsin,
Erik Mollo-Christensen. 1980, 2p
Availability: Pub. in Bulletin of the American Meteorological Society, v62 n2 p262-263 Feb 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 969/5 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Observations of Flexure and the Rheology of the Oceanic Lithosphere.
Journal article,
J. H. Bodine, M. S. Steckler, and A. B. Watts. 22 Sep 80, 15p Rept no. LDGO-3137
Contract N00014-80-C-0098, Grant NSF-OCE79-18917
Pub. in Jnl. of Geophysical Research, v86 nB5 p3695-3707, 10 May 81.

No abstract available.

AD-A101 076/8 PC **A05**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
Current Research Activities of the Department of Oceanography.
Apr 81, 79p Rept no. REF-A81-3
Contract N00014-75-C-0502

The University of Washington's Department of Oceanography has established comprehensive teaching and research programs, which are conducted by a diverse group of faculty, staff, students, and support personnel. More than 120 projects comprise our research program, which covers a broad range of oceanographic investigations and has annual expenditures in excess of eight million dollars. These investigations range from individual research projects to multidisciplinary and/or multiuniversity projects, such as the Deep Ocean Mining Environmental Study (DOMES), the first GARP Global Experiment (FGGE), the First International Biomass Experiment (FIBEX), the Global Atlantic Tropical Experiment (GATE), the International Program of Ocean Drilling (IPOD) supported by the Deep Sea Drilling Project (DSDP), the International Southern Ocean Studies (ISOS), the Manganese Nodule Program (MANOP), the Outer Continental Shelf Environmental Assessment Program (OCSEAP), the Joint U.S.-U.S.S.R. Mid Ocean Dynamics Experiment (POLYMODE), the Processes and Resources of the Bering Sea Shelf Program (PROBES), the Rivera Ocean Seismic Experiment (ROSE), and the proposed Subarctic Pacific Ecosystem Research Program (SUPER).

AD-A101 090/9 PC **A05**/MF **A01**
EG and G Washington Analytical Services Center, Inc., Rockville. MD.
Air Deployed Oceanographic Mooring (ADOM).
Progress rept. for 1980.
Apr 81, 100p Rept no. EG/G-TR-D370-0003
Contract N00014-79-C-0227

A wide variety of scientific investigations can be pursued with air deployed oceanographic moorings which are configured to specific scientific requirements. Also, a number of important oceanographic studies could be accomplished by deploying oceanographic moorings through the polar sea ice from long-range aircraft. Two systems are being developed: an open ocean moored system, and an ice-covered ocean-suspended system. Both systems are configured to measure temperature, conductivity, and pressure; however, the system design maintains flexibility to allow the addition of other types of sensors. (Author)

AD-A101 105/5 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
Derivation of Shallow Ocean Bottom Reflectance Values from Color Aerial Photography,
Donald J. Gerson, Lynn K. Fehrenbach, Kenneth R. Piech, and David W. Gaucher. Jun 81, 22p

An alternative to the field survey method of acquiring hydrographic data is described. The technique involves the use of digitized color aerial photography in the derivation of the percentage of reflectance of shallow ocean bottom materials. These spectral reflectance values can then be used in an algorithm for calculating water depths. The reflectances that were derived in this study show a close relative comparison to ground truth information. After a discussion of the causes of discrepancies between derived and actual reflectance values, it is concluded that this method of data acquisition merits further investigation due to its high geometric fidelity, its simplicity, and its cost and time-saving benefits. (Author)

PB81-219578 PC **A08**/MF **A01**
Texas A and M Univ., College Station.
Overpressured Marine Sediments Volume 1: The Prediction of Hydrofracture and Ko During Drilling.
Final rept.,
Louis J. Thompson, and Michael Joseph Callanan. 5 May 81, 158p
Contract DI-14-08-0001-G-444
See also PB81-219586, Volume 2.

The purpose of the research was to determine how the compressibility and permeability of clays is related to the Altterbery limits, percent clay, and porosity, and how these relationships are affected by temperature.

PB81-219586 PC **A08**/MF **A01**
Texas A and M Univ., College Station.
Overpressured Marine Sediments Volume 2: Compressibility and Permeability of Clays at High Pressure.
Final rept.,
Louis J. Thompson, and Honwoo Thomas Lee. 5 May 81, 167p
Contract DI-14-08-0001-G-444
See also PB81-219578, Volume 1.

The report describes a theory for hydrofracture pressure prediction derived based on mechanics involved which may not have been previously considered. Laboratory tests were used to analyze the behavior of K sub 0 for various materials under conditions which may exist in the earth. This was done in an attempt to find a relationship between K sub 0 and materials parameters which will enable estimation of K sub 0 from information obtained from cuttings during the drilling process.

8K. Seismology

AD-A100 943/0 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Seismicity at Intersections of Spreading Centers and Transform Faults.
Journal article,
Hugh Rowlett. 30 Aug 79, 8p Rept no. LDGO-3077
Contract N00014-76-C-0818, Grant NSF-DES74-24698
Prepared in cooperation with Brown Univ., Providence, RI, Dept. of Geological Sciences. Pub. in Jnl. of Geophysical Research, v86 nB5 p3815-3820 May 81. Sponsored in part by Grants NSF-OCE76-82058 and NSF-OCE79-09404.

No abstract available.

AD-A101 080/0 MF **A01**
Universidad Nacional de Tucuman (Argentina). Facultad de Ciencias Exactas y Techologia.
Regional Seismology in Argentina.
Final technical rept. 1 May 79-30 Sep 80,
Rudolf Unger. 11 May 81, 49p AFOSR-TR-81-0524
Contract F49620-79-C-0098, ARPA Order-3291
Availability: Microfiche copies only.

An orientation study on regional seismology in Argentina reveals extensive actual and projected seismometry. Data digitization is being initiated at some stations, and modern computing systems are being acquired. Most of the regional seismicity is explained in terms of the subduction of the Nazca plate under the South American continent, but also intraplate earthquakes have occurred. Part of the subduction, initially with a dip angle of 30 deg, is horizontal. Seismicity gaps exist in the Province of Tucuman, and in depth between 350 and 500 km. Source parameters for the Salta, 1973 and Caucete, 1977 earthquakes are reported. Refraction profiles suggest complex velocity structures in the earth's upper 6 km. Short-period noise levels vary more than 30 dB with local geologies. Micro-seismic storm long-period energy is mainly between 5 and 10 seconds periods. Negative first motion on Argentinian P-waves from Nevada Test Site presumed underground nuclear explosions may indicate tectonic strain release associated with these events. Primary Eurasian event signals are PKP-waves, in correspondence with standard travel time vs. distance curves. Signal arrivals between P- and S-waves seem to be P- to S-wave and S- to P-wave conversions on the lithosphere-asthenosphere boundary, according to the literature, suggesting that this boundary may be at a depth of 400 km. (Author)

AD-A101 082/6 PC **A05**/MF **A01**
California Univ., San Diego, La Jolla.
Seismic Detection and Discrimination Using Ocean-Bottom Seismographs.
Annual technical rept. 1 Oct 79-31 Dec 80,
Leroy M. Dorman, J. A. Orcutt, and Thomas H. Jordan. May 81, 76p AFOSR-TR-81-0535
Contract F49620-79-C-0019, ARPA Order-3291

Around January 29, 1980 a mild storm occurred on the Southern California coast. During this time one of our ocean bottom seismographs (O.B.S.) was periodically recording noise samples at 31 deg N, 119 deg 48 min W, about 370 km offshore in 4 km of water. The noise energy in the 1-3 Hz frequency range correlates most strongly with the wave height on the nearby coast. The local and distant wind data were dissimilar in the durations of the disturbance and in the time of the peak amplitude. We conclude that sea floor noise near 1 Hz comes predominantly from the surf. The nonlinear mechanisms which transfer energy from gravity waves on the sea surface into the sea floor are so inefficient at these frequencies that the contribution from surf a few hundred km away dominates the energy from the sea surface a few km away. An array of 4 ocean-bottom seismometers (O.B.S.) was operated for one month during June-July, 1977 at 16.5 deg N, 100.5 deg W in the Middle America Trench near Acapulco. The purpose of the experiment was to investigate the seismicity of the accretionary prism and to study the propagation of seismic waves across the continental margin. The location of earthquakes occurring landward of the OBS array was controlled by a 7-station land-based array operated by a team of Mexican seismologists under the direction of Dr. Lautaro Ponce Mori.

AD-A101 088/3 PC **A06**/MF **A01**
Southern Methodist Univ., Dallas, TX. Dallas Geophysical Lab.
Propagation Path Effects for Rayleigh and Love Waves.
Final rept. 15 Jul 76-31 Oct 80,
Eugene Herrin, and Tom Goforth. May 81, 113p AFOSR-TR-81-0534
Contract F49620-76-C-0030, ARPA Order-3291

Phase-matched filters have been developed for several paths of interest for both Rayleigh and Love waves. The filters are presented in the form of tabled values of apparent group velocity as a function of frequency. Detailed instructions are given as to how the tabled values can be used to construct phase-matched filters and how the filters can be applied to low-level signals which have travelled the same path. Application of the filters provides a time series in which the effects of multipaths have been minimized and on which the signal-to-noise ratio is improved by a factor proportional to the time compression of the signal achieved by the filtering. For a signal bandwidth of 0.1 - 0.015 Hz and an epicentral distance of 30 degrees, the signal-to-noise ratio is about 10 dB better than on the original seismogram. The filtered seismogram can be used for the determination of surface wave magnitude. (Author)

DE81024156 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Properties of Ambient Seismic Noise and Summary of Noise Spectrum in the Vicinity of RSTN Sites.
S. R. Taylor. 26 Jan 81, 48p UCID-18928
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The general characteristics of seismic noise are reviewed in terms of its source, mode of propagation, seasonal variations, and variation with depth. The characteristics of the noise spectrum as a function of depth are important for extrapolating surface noise surveys to the expected noise in a borehole. A literature review of measured noise spectra in the vicinity of the five proposed Regional Seismic Test Network sites is combined with direct noise measurements from the National Seismic Station at the Cumberland Plateau Observatory and the LRSM station at Red Lake, Ontario. Results from a recent noise survey in the Adirondacks and Black Hills are also reviewed. Minimum noise values at all five Regional Seismic Test Network sites are tabulated at 1 Hz and appear to be higher than those of the low noise model of Brune and Oliver. (ERA citation 06:024423)

8L. Snow, Ice, and Permafrost

PB81-218547 PC **A10**/MF **A01**
Wyoming Univ., Laramie. Water Resources Research Inst.
Performance Assessments of Precipitation Gages for Snow Measurement.
Completion rept.,
Paul A. Rechard, and Tsong C. Wei. Sep 80, 202p SER-76, W81-03727, OWRT-A-015-WYO(3)
Contracts DI-14-31-0001-4051, DI-14-31-0001-5051
Sponsored in part by Department of Commerce, Washington, DC.

Snow measurement with a precipitation gage is affected by snow properties, air turbulence, and gage configuration. Various shields are used to reduce the effects of these factors and to improve the catch performance of the gage. In this investigation, comparisons were made of several. In addition, Hamon's proposed dual-gage approach was tested and the effects of wind speed and air temperature on the gage catch were analyzed. Precipitation measured by an Alter-shielded gage in a forest opening was used as the standard catch. The catch by the Raised-Wyoming-shielded gage was found to be free from wind effects and to correlate well with the standard catch.

PB81-871675 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Iceberg Tracking and Towing. January, 1966-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 66-Jul 81.
Jul 81, 108p

The tracking of icebergs by means of remote sensing is considered in terms of protection of offshore structures and transport of oil by pipeline or tanker. The transport of icebergs to arid regions as a fresh water source is also considered with respect to thermal insulation and heat transfer. (Contains 127 citations fully indexed and including a title list.)

8N. Terrestrial Magnetism

AD-A100 937/2 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA. Dept. of Geology and Geophysics.
Viscous Demagnetization and the Longevity of Paleomagnetic Polarity Messages,
Charles R. Denham. 2 Sep 80, 10p Rept nos. WHOI-81-52, WHOI-CONTRIB-4709
Contract N00014-74-C-0262
Pub. in Geophysical Research Letters, v8 n2 p137-140 Feb 81.

No abstract available.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A100 888/7 PC **A04**/MF **A01**
Hughes Aircraft Co., Torrance, CA. Electron Dynamics Div.
Linear 1 kW Multitone Troposcatter TWT.
Final rept. 1 Sep 77-30 Jan 81,
A. L. Rousseau. May 81, 59p EDD-W-07564-F, DELET-TR-77-2713-F
Contract DAAB07-77-C-2713
See also Rept. no. ECOM-75-1283-f, AD-A017 955.

This is the final report on a program to design, construct, and test a high power, G-Band TWT capable of amplifying multiple signals while minimizing any mixing products which results from non-linear operation. The approach is to operate the tube backed off from saturation to fulfill the distortion specification and incorporate a four-stage depressed collector to enhance the efficiency. One experimental model of the 673H was produced. Details of the designs of the electron gun, coupled-cavity interaction circuit, and multi-stage, air-cooled collector are presented. Preliminary electrical performance data were obtained. (Author)

AD-A100 962/0 PC **A09**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Study of the Physics of Insulating Films as Related to the Reliability of Metal-Oxide-Semiconductor (MOS) Devices.
Semiannual technical rept. 1 Dec 80-31 May 81,
D. J. DiMaria, K. M. DeMeyer, D. W. Dong, L. M. Ephrath, and A. Hartstein. Jun 81, 191p
Contract MDA903-81-C-0100, ARPA Order-4012

This report covers a discussion of high current injection into wide bandgap insulators, the use of Si-rich SiO2 in DEIS EAROM FET's, modeling calculations for predicting the operation of DEIS EAROM's, the relationship of electron traps in SiO2 to OH groups and H2O, the physics of very thin (50-200 A) gate insulators, the relationship of interface state generation to electron capture on trapped holes near the Si-SiO2 interface, radiation damage of SiO2 layers exposed to plasmas, the effect of annealing on the Al-SiO2 interfacial energy barrier, and a techique for measuring the diffusion of an oxidant in SiO2 films. (Author)

AD-A100 971/1 PC **A07**/MF **A01**
Texas Tech Univ., Lubbock. Dept. of Electrical Engineering.
Application of Surface Analysis Techniques to Pulsed Power Problems.
Technical rept.,
G. L. Jackson. 23 Mar 81, 146p AFOSR-TR-81-0501, AFOSR-PP-1
Contract F49620-79-C-0191

An assessment of some of the advantages and disadvantages of various surface analysis techniques applied to the analysis of both the insulators and conductors used in high voltage spark gaps is presented. Some of the analysis techniques introduced include Electron Spectroscopy for Chemical Analysis, Auger Electron Spectroscopy, X-ray Fluorescence, and Secondary Ion Mass Spectroscopy. The purpose of this review is to present some of these analysis techniques with emphasis placed on those techniques which give information about changes that occur on or near the surfaces on insulators and conductors. Surface charging makes most analysis techniques incapable of giving useful information about the changes on or near the surface of insulators. Because of the amount of information available from a single ESCA spectrum, such as shifts in binding energies due to changes in chemical environment, Auger electron peaks due to the relaxation of the atom after photoionization, and the quantitative information, ESCA is the best analysis technique available for the investigation of insulators. Also the problem of surface charging in ESCA is minimal. The analysis of conductors, however, is less complicated because surface charging is no longer a problem. Therefore, the use of AES, SIMS, and ESCA can all give some useful information about conductor surfaces.

AD-A101 078/4 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Monolithic ZnO SAW Structures.
Interim scientific rept. 1 May 80-30 Apr 81,
R. L. Gunshor, and R. F. Pierret. 1 Jun 81, 30p AFOSR-TR-81-0521
Grant AFOSR-77-3304

A range of ZnO-on-Silicon surface acoustic wave devices have been fabricated and tested. Both diode and magnetion rf sputtering was employed. A new transducer for the monolithic configuration was reported which permits increased operating frequencies. The first SAW resonator on silicon was constructed and operated. Both high Q and excellent temperature stability was observed. (Author)

DE81023683 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Partial Discharge Testing of Bulk Transformer Oil.
G. J. Rohwein. 1981, 4p SAND-81-0551C, CONF-810659-8
Contract W-31-109-ENG-38
IEEE international pulsed power conference, Albuquerque, NM, USA, 1 Jun 1981.
Microfiche only after original copies are exhausted.

The generation of partial discharges in bulk transformer oil has been investigated experimentally to determine the dominant conditions which contribute to their formation and growth under repetitive impulse stresses. The motivation for conducting these experiments arose from a problem with partial discharges and breakdowns occurring in the insulating oil around the high voltage switch in a continuous running 1.5 MV repetitive pulser system. From the experiment it was found that repetitive stressing caused low level field ionization around the electrodes which led to bubble formation and eventually partial discharges. There were also qualitative indications of charge accumulation in the oil. Photographic records of numerous shot sequences were used to study the phenomena. (ERA citation 06:023459)

N81-26259/4 PC **A03**/MF **A01**
Syracuse Univ., NY. Dept. of Electrical and Computer Engineering.
Surface Acoustic Waves/Silicon Monolithic Sensor Processor.
S. T. Kowel, P. G. Kornreich, M. A. Fathimulla, and E. A. Mehter. Jun 81, 27p NASA-CR-164476, REPT-4
Grant NSG-1611
Original Contains Color Illustrations.

Progress is reported in the creation of a two dimensional Fourier transformer for optical images based on the zinc oxide on silicon technology. The sputtering of zinc oxide films using a micro etch system and the possibility of a spray-on technique based on zinc chloride dissolved in alcohol solution are discussed. Refinements to techniques for making platinum silicide Schottky barrier junctions essential for constructing the ultimate convolver structure are described.

N81-26372/5 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Capacitor Technologies, Applications and Reliability.
Jun 81, 158p NASA-CP-2186, M-351
Proceedings of a Symp. Held at Marshall Space Flight Center, Ala., 24-25 Feb. 1981.

No abstract available.

PAT-APPL-6-258 084 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Waveguide Coupler Using Three or More Wave Modes.
Patent Application,
Larry R. Barnett. Filed 27 Apr 81, 21p AD-D008 549/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A coupler is given employing two similar sections of waveguide which extend colinearly in longitudinal succession. Adjacent ends of the guide sections are spaced apart to form a gap in the boundary of the sections. A third section of waveguide is disposed external to and coaxial with at least a part of each of the the two waveguide sections to provide a boundary surrounding the gap. Electromagnetic energy propagating down one of the two similar sections of waveguide in a first mode and entering the gap is converted partly to a plurality of other modes. The converted energy is reconverted to the first mode upon reaching the other of the two similar sections of waveguide. The electric field pattern exciting the section of waveguide at the end of the gap and propagating down it is exclusively in the first mode. The cutoff-determining dimensions of the third section of waveguide and the gap separation are determined from the condition that the phase relationship between the modes at the end of the gap be the same, to within a integral multiple of 2 pi, as what they were at the beginning of the gap, to insure complete transfer of power between the two similar sections of waveguide. (Author)

PB81-216343 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Optical Measurements for Interfacial Conduction and Breakdown (1980).
Annual rept.,
R. E. Hebner, E. F. Kelley, J. E. Thompson, T. S. Sudarshan, and T. B. Jones. May 81, 90p NBSIR-81-2275
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with South Carolina Univ., Columbia, and Colorado State Univ., Fort Collins.

Techniques have been developed to measure the electric field distribution along an interface between insulating materials. Specifically, systems have been developed to measure the fields in transformer oil using the Kerr effect and to measure the surface charge at a gas-solid interface using the Pockels effect. Measurements are supplemented by calculations of the distortion produced by selected interfacial charge distributions. The relatively pure transformer oil used in these studies showed little space charge distortion of the electric field. THere also was no statistically significant preference for breakdown in the vicinity of the interface. At vacuum-solid interfaces, however, interfacial breakdown was observed and surface charging was measured. As gas is introduced into the system, the surface charge is removed so that no effect of surface charging was detected at atmospheric pressure. At pressures above atmospheric, there is evidence that surface charging may again become important.

PB81-218182 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Electric and Magnetic Field Measurements.
Annual rept. 80,
R. H. McKnight, F. R. Kotter, M. Misakian, and P. Ortiz. Feb 81, 73p NBSIR-81-2267

The NBS program is concerned with developing methods for evaluating and calibrating instrumentation for use in measuring the electric field and various ion-related electrical quantities in the vicinity of high-voltage direct current (HVDC) transmission lines and in apparatus designed to simulate the transmission line environment.

PB81-220261 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Development of Power System Measurements.
Quarterly rept. 1 Jan-31 Mar 81,
R. E. Hebner. Apr 81, 20p NBSIR-81-2283

This report emphasizes the errors associated with measurements of the vertical current density in an electrical environment consisting of a dc field with space charge, the measurement of rf attenuation in distribution cables, the onset characteristics of positive and negative corona in compressed SF6 gas, and the measurement of the space charge density in transformer oil subjected to 60-Hz excitation.

PB81-807026 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
IMPATT Diodes. 1978-June, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1978-Jun 81.
Jul 81, 258p
Supersedes PB80-808330, and NTIS/PS-79/0398. See also 1975-1977, NTIS/PS-79/0397.

Research reports covering the design, characterization, and applications of IMPATT Diodes are cited from worldwide research. Topics include reliability, power handling, properties, noise, fabrication, and mathematical analysis. The use of silicon and gallium arsenide IMPATT diodes for microwave generation and amplification are included. (This updated bibliography contains 251 citations, 80 of which are new entries to the previous edition.)

PB81-807034 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
IMPATT Diodes. 1964-June, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 81.
Jul 81, 216p
Supersedes PB80-808322, and NTIS/PS-79/0396.

Government-sponsored research reports are cited covering the design, characterization, and applications of IMPATT diodes. Topics include reliability, power handling, properties, noise, fabrication, and radiation effects. Studies are included on the use of silicon and gallium arsenide IMPATT diodes for microwave generation and amplification. (This updated bibliography contains 209 citations, 13 of which are new entries to the previous edition.)

9B. Computers

AD-A100 593/3 PC **A02**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Concurrency Control Overhead or Closer Look at Blocking vs. Nonblocking Concurrency Control Mechanisms,
Dusan Z. Badal. Jun 81, 25p Rept no. NPS52-81-005

In this paper we divide concurrency control (CC) mechanisms for distributed DBMS's (DDBMs) into three classes. One class consists of blocking CC mechanisms and two classes contain nonblocking CC mechanisms. We define CC overhead and derive it for conflicting and nonconflicting transactions for each class of CC mechanisms. Since CC overhead is dependent on CC mechanism only, it can be used as a metric for comparison of CC mechanisms and as a measure of CC load on DDBMS resources. We also describe two new nonblocking distributed concurrency control mechanisms which use the concept of multiple data object versions. One is based on time stamp ordering of transaction execution and the other is based on nonserializable execution detection and recovery to serializable execution. We compare both with distributed two-phase locking. (Author)

AD-A100 651/9 PC **A05**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA.
Compilation of Nonprocedural Specifications into Computer Programs.
Technical rept.,
N. S. Prywes, and A. Pnueli. 1 Apr 81, 85p
Contract N00014-76-C-0416

The article describes the compilation of a program specification written in the Very high Level nonprocedural MODEL language into an object (PL/I or Cobol) procedural language program. Nonprocedural programming languages are descriptive and devoid of procedural controls. They are therefore easier to use and require less programming skills than procedural languages. First, the MODEL language is briefly presented and illustrated. An important phase in the compilation process is the representation of the specification by a dependency graph denoted as array graph which expresses the interdependency between statements. Two classes of algorithms which utilize this graph representation continue the compilation process. The first class checks various completeness, non-ambiguity and consistency aspects of the specification. Upon detesting any faults the system attempts some automatic correcting measures which are reported to the user. Alternately when no feasible corrections are possible it reports an error and solicits a user modification.

AD-A100 652/7 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
Operational Survivability in Gracefully Degrading Distributed Processing Systems.
Technical rept.,
Edith Waisbrot Martin. Dec 80, 86p Rept no. GIT-ICS-81/04
Contract N00014-79-C-0231

A simulator was designed and developed which will model possible distributed system network topologies, distributed system application topologies and their effect on application system performance as the configuration of the distributed system network is continuously and arbitrarily reduced. The objective of the model is to aid in development of a measure of survivability which can subsequently be used to evaluate and compare alternative distributed system designs for specific battlefield applications.

AD-A100 654/3 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
Research Program in Fully Distributed Processing Systems.
Quarterly progress rept. no. 6, 1 Dec 80-28 Feb 81,
Mar 81, 14p
Contracts N00014-79-C-0873, F30602-78-C-0120 Sponsored in part by Contracts DAAG29-79-C-0155, DAAK70-79-D-0087 and Grants NSF-MCS77-28305.

The Georgia Tech Research Program in Fully Distributed Processing Systems is a comprehensive investigation of data processing systems in which both the physical and logical components are extremely loosely coupled while operating with a high degree of control autonomy at the component level. The definition of the specific class of multiple computer systems being investigated, and the operational characteristics and features of those systems is motivated by the desire to advance the state-of-the-art for that class of systems that will deliver a high proportion of the benefits currently being claimed for distributed processing systems. The scope of individual topics being investigated under this program ranges from formal modeling and theoretical studies to empirical examinations of prototype systems and simulation models. Also included within the scope of the program are areas such as the utilization of FDPS's and their interaction with management operations and structure.

AD-A100 661/8 PC **A02**/MF **A01**
Princeton Univ., NJ. Information Sciences and Systems Lab.
Performance Analysis of an Optimum Detector with Counting Point Process Observations,
Aurel A. Lazar, and Stuart C. Schwartz. Oct 80, 9p
Contract N00014-80-C-0530
Prepared in cooperation with Columbia Univ., New York. Presented at the Annual Allerton Conference on Communication, Control, and Computing (8th), 8-10 Oct 80.

Tranformations of the classical hypothesis testing problem with continuous-time observations to a hypothesis testing problem with counting point process observations are considered. A general form for the random intensity rate (RIR) which can accommodate feedback is investigated and the optimal solution in the Neyman-Pearson sense is specified. An analysis of the performance of the corresponding optimum processor is studied. (Author)

AD-A100 662/6 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
Statistical Measures of Software Reliability,
Richard A. DeMillo, and Frederick G. Sayward. Oct 80, 24p Rept no. GIT-ICS-80/10
Contract N00014-79-C-0231
Prepared in cooperation with Yale Univ., New Haven, CT. Dept. of Computer Science.

Estimating program reliability presents many of the same problems as measuring software performance and cost: the central technical issue concerns the existence of an independent objective scale upon which may be based a qualitative judgement of the ability of a given program to function as intended in a specified environment over a specified time interval. Several scales have already been proposed. While these concepts may have independent interest, they fail to capture the most significant aspect of reliability estimation as it applies to software: most software is unreliable by these standards, but the degree of unreliability is not quantified. A useful program which has not been proved correct is unreliable, but so is, say, the null program (unless by some perversity of specification the null program satisfies the designer); an operationally meaningful scale of reliability should distinguish these extremes. In the sequel, we will sketch the outlines of the traditional theory that is most relevant to software reliability estimation, give a brief critical analysis of the use of the traditional theory in measuring reliability, and describe another use of the R(t) measure which we believe more closely fits the intuitive requirements of the scale we asked for above.

AD-A100 736/8 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Application of Discriminant Analysis Techniques to G-Stress Analysis in Computer Voice Decoding.
Master's thesis,
Nadine E. Levine. Dec 80, 75p Rept no. AFIT/GCS/EE/80D-11

The Statistical Package for the Social Sciences (SPSS) Discriminant Analysis Routines were applied to speech data obtained at various gravity levels. The data were created on the Air Force Medical Research Lab's Centrifuge at Wright-Patterson Air Force Base. They were then digitally sampled and Fourier transformed to 64 frequency bands which were converted to two separate files; one the 16 frequencies used by Guyote and Sisson; one the 19 frequencies used by Threshold Technology, Inc. These files were then further processed: summing the energy across time slices, summing across frequency bands, and averaging across frequency bands. Statistical results showed that G-Stress seemed to be moving energy across time slices, more than shifting across frequencies. (Author)

AD-A100 744/2 PC **A02**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
DoD Research Program in Robotics.
Final rept.,
John M. Vranish. 10 Sep 80, 14p Rept no. NSWC/TR-80-325

This paper is a broad, brief overview of the DoD Research Program in Robotics. It begins with background examples on some of the needs and current robotic techniques being used in DoD activities. It then discusses near future robotic systems currently projected for funding. Next, projections are made for the more far-term future DoD robotic systems. Finally, specific areas requiring research are delineated and Navy research programs are identified which address these areas. (Author)

AD-A100 754/1 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Nested Transactions: An Approach to Reliable Distributed Computing.
Doctoral thesis,
John Eliot Blakeslee Moss. Apr 81, 182p Rept no. MIT/LCS/TR-260
Contract N00014-75-C-0661, Grant NSF-MCS79-23769

We examine how to program a system so that the software continues to work in the face of a variety of failures of parts of the system. The design presented uses the concept of transactions: collections of primitive actions that are indivisible. The indivisibility of transactions insures that consistent results are obtained even when requests are processed concurrently or failures occur during a request. Our design permits transactions to be nested. Nested transactions provide nested universes of synchronization and recovery from failures. The advantages of nested transactions over single-level transactions are that they provide concurrency control within transactions by serializing subtransactions appropriately, and that they permit parts of a transaction to fail without necessarily aborting the entire transaction. The method for implementing nested transactions described in this report is novel in that it uses locking for concurrency control. We present the necessary algorithms for locking, recovery, distributed commitment, and distributed deadlock detection for a nested transaction system. While the design has not been implemented, it has been simulated. The algorithms are described in a formal notation in an appendix, as well as narratively in the body of the report.

AD-A100 776/4 PC **A04**/MF **A01**
Rockwell International, Anaheim, CA.
Programmable Image Processing Element.
Final rept. Sep 79-Sep 80,
Stanley A. White. Feb 81, 66p C80-702/501, AFWAL-TR-80-1208
Contract F33615-79-C-1905

The generic signal-processing equations were analyzed and two specific architectures were evolved for the efficient implementation of these equations. The first architecture which was considered consisted of a set for four arithmetic sections. Each section was capable of combining a pair of 4-element vectors, 16 bits per element, using distributed arithmetic. The second architectural design was pursued which consisted of a single arithmetic section. Input word lengths are limited to 8 bits, 2's complement. Coefficients are variable. The output is full precision. Input data (x's) may be loaded in parallel sequentially, or in parallel 3 at a time; or serially 1, 3 or 9 at a time. The device can be programmed to function as a sliding window, a transversal filter, or a vector multiplier. Multiple devices may be chained together to increase computational accuracy or to extend filter lengths beyond 9 taps.

AD-A100 777/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Writing a Software Package for an EMR 760 BDC on the VAX-11/780.
Master's thesis,
David L. Rall. Dec 80, 137p Rept no. AFIT/GCS/EE/80D-13

A device driver for an EMR 760 BDC was written for the VAX-11/780. An Application program was written to use the driver and transfer rates in excess of 190,000 sixteen bit words per second were realized. The package successfully transferred 10 Mb to disk using DMA operations. The techniques for writing device drivers on the VAX-11/780 are discussed. (Author)

AD-A100 784/8 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Functional Level Preprocessor for Computer Aided Digital Design.
Master's thesis,
Peter G. Raeth. Dec 80, 200p Rept no. AFIT/GCS/EE/80D-12
Availability: Microfiche copies only.

While good gate level and register transfer level digital simulators exist, one can not easily integrate the two due to their inherent limitations. A given simulation can not be described partially in gate level and partially in a higher level. A solution is to create a functional level preprocessor and a library of functional device models linked to a gate level simulator's input language. This permits the mixing of behavioral models with gate level models in the same system structure. The combination of processes (element models or primitives) and their structure (interconnections) can be exercised all at one time during a single simulation session. Two separate pieces of software were written to implement a specific solution to the above situation. SISL (Structural Interface to the Salogs Language) was created. This is a functional level preprocessor to SALOGS (SAndia LOGic Simulator) which is an eight-state, MOS, gate level digital systems simulator. SISL will accept functional level systems descriptions and convert them to a form acceptable to SALOGS. The other effort was the building of a functional level modeling library. This library consists of three behavior models: a 4-16 decoder, a 2048 X 8 ROM, and a 256 X 8 RAM. These

models are designed to be used in a functional level/gate level model of a digital system and will link to the SALOGS run time system. Together SISL and the modeling library provide the easy use of the top-down approach to digital system design.

AD-A100 790/5 PC **A04**/MF **A01**
Air Force Inst. of Tech.. Wright-Patterson AFB, OH. School of Engineering.
Microcode Development System for the Micro-programmable Minicomputer Emulator (MiME).
Master's thesis,
Glenn H. Carroll. Dec 80, 65p Rept no. AFIT/GE/EE/80D-12

This report covers the continuing efforts to develop the Microprogrammable Minicomputer Emulator (MIME) into a more flexible and user oriented machine. This consisted of the development of a Microprogram Development System for the MIME as well as hardware enhancements. The amount of writable control store was increased and the ability to load and dump control under program control was added. An LSI-11 microcomputer was added to the system to allow the user to communicate with the other computers in the system, and to transfer files from one computer to another. Several software tools were also produced: (1) a program to semi-automate the generation of the punched cards used to document the MIME's hardware configuration, (2) an executive that runs on the LSI-11 to communicate with the other computers and the user, and to transfer the microcode files, and (3) updating the MIME Modest Monitor to communicate on a higher level and add several new features.

AD-A100 796/2 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Preliminary Design and Implementation of an Ada Pseudo-Machine.
Master's thesis,
Alan R. Garlington. Mar 81, 121p Rept no. AFIT/GCS/MA/81M-1

This project involved defining an Ada pseudo-machine and developing an Ada to pseudo-code test translator. The translator's front end incorporates a table-driven parser that can parse the entire proposed-standard Ada language. The translator's semantic routines allow integer data objects, several control structures, procedures, functions, packages and tasks. These routines generate pseudo-code that is executed by an interpreter program included in the translator. The interpreter constitutes a complete description of the pseudo-machine whose architecture consists of multiple, stack-oriented processors that access a common memory. Interesting features of the project include the hash-coded symbol table that supports Ada's visibility rules and the pseudo-machine architecture that supports Ada's tasking. (Author)

AD-A100 814/3 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
ASGOL-An ALGOL-Structured Graphics Oriented Language.
Master's thesis,
James David Hart. Mar 81, 161p Rept no. AFIT/GCS/MA/81M-2

An ALGOL-like graphics oriented language and system was designed to provide a block-structured format to graphics programs. The system was developed with an LR(1) parsing procedure technique, and graphs are constructed using the DISSPLA software package as the 'host' to generate device-independent plot files. The language produces linear, bar and pie graphs, as well as having a text processor to draw a variety of character styles and fonts for documentation. (Author)

AD-A100 819/2 PC **A09**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Construction of a General Purpose Command Language for Use in Computer Dialog.
Master's thesis,
Wayne D. Griess. Sep 80, 200p Rept no. AFIT/GCS/EE/80S-15

Two computer programs were developed and implemented to enable intercommunication between a Data General NOVA/ECLIPSE computer system and another modem linked computer system. One program, called TTERMOP, allows a user to sit at a NOVA terminal and interact with a connected system in a transparent mode. The other program, called MONITOR, is a command language interpreter that examines and executes instructions contained within an action file. An action file, consisting of instruction strings and associated control parameters, is designed to be dependent upon a connected system with regard to contents, yet independent of such a connected system with regard to structure and format. The interpreter is written in FORTRAN IV with FORTRAN and assembly language modules. Actual implementation of the programs is accomplished between the NOVA/ECLIPSE and the Aeronautical Systems Division Control Data CYBER computer system. ASCII data files between 20 and 35,000 bytes have been transferred between the two interconnected systems, each transfer initiated by a single string command acceptable to the interpreter and compatible with a tailored action file for the CYBER system. The programs were designed to be flexible enough for use with several different connected systems, and general enough to be hosted on a system other than the NOVA/ECLIPSE.

AD-A100 822/6 PC **A14**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of a Local Computer Network for the Air Force Institute of Technology Digital Engineering Laboratory.
Master's thesis,
Williams C. Hobart, Jr. Mar 81, 323p Rept no. AFIT/GE/EE/81M-3

A local computer for the Air Force Institute of Technology Digital Engineering Laboratory was designed and the network command language interpreter modules were implemented. The requirements for this network were specified by interviewing nine faculty members associated with the Digital Engineering Laboratory and then translating their functional requirements into a detailed set of hardware and software system requirements. Structured Analysis was used to produce a structured specification for the applications, host-to-host, network, and link protocol requirements. Yourdon and Constantine's Transform Analysis and Transaction Analysis techniques were then used to develop a set of module structure charts for the software design. The network uses a loop topology for the software design. The network uses a loop topology for the nodes with a star of up to four hosts connected to each node. The nodes are implemented using a Universal Network Interface Device (UNID) developed at the Air Force Institute of Technology. Initially, the network will include an Intel Series II Microcomputer Development Station, a Digital Equipment Corporation VAX-11/780, and a Data General Nova.

AD-A100 841/6 Not available NTIS
Georgia Inst. of Tech., Atlanta.
On Describing the Behavior and Implementation of Distributed Systems,
Nancy A. Lynch, and Michael J. Fischer. 1981, 28p ARO-16451.3-EL
Contract DAAG29-79-C-0155, Grant NSF-MCS77-02474
Availability: Pub. in Theoretical Computer Science, v13 p17-43 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 852/3 PC **A05**/MF **A01**
Texas Instruments, Inc., Dallas. Central Research Labs.
Programmable Image Processing Element.
Final technical rept. 1 Aug 79-31 Jul 80,
Tom F. Cheek, W. L. Eversole, and J. F. Salzman. Nov 80, 78p AFWAL-TR-80-1209
Contract F33615-79-C-1763

The objective of this 12-month exploratory development was to develop a general-purpose, digital, large-scale integrated circuit device, called the programmed image-processing element (PIPE), which can be programmed to perform a variety of signal-processing functions such as Cosine and Hadamard transforms, edge extraction, unsharp masking, pole-zero filtering, and signal smoothing. The PIPE devices can operate on 8 x 1 or 3 x 3 element data blocks. The PIPE LSIC is suited for those airborne applications where data rate, size, power, and weight restrictions prohibit the use of general-purpose microprocessors or high-speed digital multipliers. This article adresses only the design and photomask fabrication of the PIPE LSIC. During the design phase of the program, several architectures were investigated as candidates for implementing the PIPE LSIC. The read-only-memory (ROM)-accumulate architecture was selected, which maximizes flexibility in algorithm implementation and minimizes external control and timing logic. Investigations of ROM technologies and designs to ensure a user-oriented image-processing LSIC were conducted. The N-channel metal-oxide-semiconductor (NMOS) technology was selected to implement the PIPE LSIC because it is an established, cost-effective technology capable of providing the high-circuit density and low speed-power product. The user-erasable, programmable memory (EPROM) was judged to be the best memory technology to meet the goals of the PIPE LSIC. The PIPE LSIC design completed during this contract has five major sections: input latch/parallel-to-serial shift register, EPROM, shift-and-accumulate, tri-state output latch, and controller.

AD-A100 865/5 PC **A03**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Computer Science.
Portability of Operating System Software.
Final technical rept. Sep 79-Mar 81,
V. E. Wallentine. 1 Jun 81, 40p TR-81-05, ARO-16160.7-A-EL
Grant DAAG29-78-G-0200

In this document we summarize the results of a study into the adaptability of system software to a computer network. We first discuss the structure of a Network Adaptable Executive - (NADEX) written in concurrent Pascal. We then discuss the performance of NADEX and the impact of concurrent Pascal on the performance of NADEX. (Author)

AD-A100 880/4 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of an Interactive Input Graphics System Based on the ACM Core Standard.
Master's thesis,
Harold Leon Curling, Jr. Dec 80, 109p Rept no. AFIT/GCS/EE/80D-6

A design has been developed for the interactive input section of a graphics system based on the ACM/SIGGRAPH CORE standard of 1979. The input system has been designed for use on a Digital Equipment Corporation VAX 11/780 computer within the VAX/VMS operating system and contains the design for a device driver for the Tektronix 4014 graphics terminal. The design is readily expandable to include software drivers for other graphics devices. The Warnier-Orr diagram method of software design has been used as the vehicle for the development of the design. Three dimensional functions, the STROKE logical device and asynchronous event generation and data access are not supported by the design. However, all input functions required by the CORE standard have been included in the design. (Author)

AD-A100 881/2 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Jovial (J73) to Ada Translator System.
Master's thesis,
Richard L. Brozovic. Dec 80, 101p Rept no. AFIT/GCS/EE/80D-5

In recent years the Air Force has developed a standard programming language, J73, for use in embedded computer systems. Now that the Air Force has a considerable investment in systems that are currently being developed with J73, the Department of Defense has selected a high order programming language, Ada, that will become the standard for programming embedded computer systems throughout the Department of Defense. Also under development is the definition of a support environment for Ada. One of the tools of this support environment should be a translator that

will produce Ada source programs from J73 source programs. The subject of this research project was the design and development of a Jovial (J73) to Ada Translator System (JATS). The resulting system accepts J73 programs and produces equivalent Ada programs to the extent possible while identifying segments of J73 code that were not translated. This project made use of language parsing techniques and various data structures to support the translation process. Several problem areas are identified with possible solutions. The translator system should be a useful tool in the transition from J73 to Ada. (Author)

AD-A100 889/5 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
Multilevel Atomicity - A New Correctness Criterion for Distributed Databases.
Technical rept.,
Nancy A. Lynch. May 81, 34p GIT-ICS-81/05, ARO-16451.11-EL
Contracts DAAG29-79-C-0155, N00014-79-C-0873
Sponsored in part by Grant NSF-MCS79-24370.

This report presents a model for a distributed data base consisting of two completely distinct levels--a physical level consisting of node processors connected by a message system and communicating with users by ports, and a logical level consisting of a centralized concurrent application data base. (The logical level does not involve nodes, messages, or any other distribution information.) It is the job of the physical system to implement, in some appropriate sense, the application data base. (Author)

AD-A100 915/8 PC **A05**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Secondary Storage Methods for Solving Symmetric, Positive Definite, Banded Linear Systems.
Doctoral thesis,
John Richard Perry. Apr 81, 88p Rept no. RR-201
Contracts N00014-76-C-0277, F49620-77-C-0037

The solution of a linear system of equations $Ax=b$ is often computed using variations of Gaussian elimination. A major problem with these methods is the large storage requirement to compute the factorization of matrices that arise in practice. We focus on the Cholesky method for factoring banded, symmetric, positive definite matrices, which arise in finite-difference and finite-element simulations. We develop and analyze methods for using secondary storage in cases where there is not enough primary memory to compute the band Cholesky factorization. Many computer configurations used for scientific computation allow for control over the parallel execution of I/O and computation. For several of the secondary storage methods, we present storage and I/O schemes that allow I/O to be overlapped with computation. We derive conditions under which the factorization is compute-bound, i.e., all I/O between the initial input and the final output is completely hidden behind concurrent computation. Further, we show that the amount of memory needed to achieve compute-boundedness is independent of the size and bandwidth of the matrix. Thus, for a given processor speed and I/O rate, a constant amount of memory is sufficient to keep the processor busy during the band Cholesky factorization.

AD-A100 942/2 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Highly Portable System for Acquiring and Processing AXBT's.
Memorandum rept.,
D. Steiger. 8 Jul 81, 23p Rept no. NRL-MR-4536

At the Naval Research Laboratory highly portable intelligent computer terminals are being utilized aboard aircraft to acquire and process data received from Airborne Expendable Bathythermographys (AXBT's). Discussed in the paper is the design and implementation of the data acquisition and processing system which includes a detailed description of the hardware and software utilized. (Author)

AD-A101 042/0 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Electrical and Computer Engineering.
Vectorized Sparse Elimination.
Interim rept.,
D. A. Calahan. 8 Jun 80, 34p AFOSR-TR-81-0542
Grant AFOSR-80-0158

This report summarizes research investigating: (1) algorithms for the vectorized direct solution of sparse simultaneous equations; and (2) the application of vector processors to electronic circuit analysis. The research was performed between 4-1-80 and 3-31-81. (Author)

AD-A101 061/0 PC **A17**/MF **A01**
SofTech, Inc., Waltham, MA.
Computer Programming Manual for the Jovial (J73) Language.
Final techincal rept. Sep 78-Jan 80.
Jun 81, 386p RADC-TR-81-143
Contract F30602-78-C-0188

This manual is a combined tutorial and reference manual for the JOVIAL (J73) language as defined in MIL-STD-1589A dated 15 March 1979. The main body of the manual describes the entire language, giving motivation and examples for each feature. This manual is intended for a reader who has had previous experience with assembly language or some higher order language. It does not teach the fundamentals of programming. On the other hand, the presentation is informal and nonmathematical. (Author)

AD-A101 063/6 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Industrial and Management Systems Engineering.
A Generalized Computer Simulation Language for Naval Systems Modeling.
Final rept. Aug 79-Jun 81,
William E. Biles, and Ardavan Nozari. 30 Jun 81, 125p
Contract N00014-79-C-0757

This report describes NAVMAP, a generalized computer simulation language for naval systems modeling. NAVMAP is designed to be highly flexible, compact and portable. It is a FORTRAN-based language for discrete-event, continuous and state-event modeling. It is designed to easily interface with FORTRAN-based software for statistical methodology and optimization. NAVMAP (Naval Modeling and Analysis Program) is intended to serve as the basis for a consistent simulation modeling approach among naval research laboratories. (Author)

AD-A101 072/7 PC **A03**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
An Image Processing Software Package.
Technical rept.,
Chihsung Yen. 30 Jun 81, 37p Rept no. SMU-EE-TR-81-11
Contract N00014-79-C-0494

A software package of major image processing functions is provided with illustrative computer results based on real imagery. (Author)

AD-A101 127/9 PC **A05**/MF **A01**
California Univ., Los Angeles. Dept. of Computer Science.
Markov Models for Multiple Bus Multiprocessor Systems.
Final rept.,
Marco Ajmone Marsan, and Mario Gerla. Feb 81, 93p Rept nos. UCLA-ENG-8203, CSD-810304
Contract N00014-79-C-0866

Markovian models are developed for the performance analysis of multiprocessor systems intercommunicating via a set of busses. The performance index is the average number of active processors, called processing power. From processing power a variety of other performance measures can be derived as dictated by the specific processor application. Exact models are first introduced, and are illustrated with a simple example. The computational complexity of the exact models is shown to increase very rapidly with system size, thus making the exact analysis impractical even for medium size systems. To overcome the complexity of computation, several approximate models are introduced. The approximate results are compared with the exact ones and found to be surprisingly accurate for a wide range of configurations. Simulation is used to validate the analytic models and to test their robustness. (Author)

AD-A101 155/0 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
A Comparison of Some Reliable Test Data Generation Procedures.
Interim technical rept.,
Richard A. DeMillo, Daniel E. Hocking, and Michael J. Merritt. Apr 81, 35p Rept no. GIT-ICS-81/08
Contracts DAAG29-80-C-0120, N00014-79-C-0231

A set of mutants of a program P, M(P), is a finite subset of the set of all programs written in the language of P, and EM(P) is the set of programs in M(P) which are (functionally) equivalent to p. For a set of test data T, DM(P,T) is the set of programs in M(P) which give results differing from P on at least one point in T. As described elsewhere, it is possible to choose the function M so that ms $(P,T) = 1$ only if T demonstrates the correctness of P with high probability. This paper is a case study of four test data generation schemes. For a fixed program P, five sets of test data are generated and mutation scores are calculated using the FMS.2 mutation system. Since each set has a score less than one, the FMS.2 system is used to derive a set T such that $ms(P,T)=1$.

AD-A101 172/5 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
The Sensor Image Simulator.
Interim rept. Oct 79-May 81,
Marshall B. Faintich, Paul C. Figura, and E. W. Quinn. 22 Jun 81, 21p

The primary objective of the digital sensor simulation investigations being conducted at the Defense Mapping Agency (DMA) is to establish an editing and analysis capability for the digital culture and terrain data bases. For purposes of quality control and data base applicability investigations, DMA has developed the Sensor Image Simulator (SIS), a very high speed data base edit station and static scene simulator that allows for interactive query and manipulation of individual features in the data base displays and/or simulated sensor scenes to determine the corresponding data base elements responsible for the simulated features. The SIS was installed at DMA in 1981, and is designed to play a key role in determining the applicability of prototype data bases for use in advanced training simulators, as well as to ensure the quality of, and coherence between, the various digital data bases prior to new data insertion into the master cartographic data base files. (Author)

CONF-810533-4 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Nonvolatile Memory Technology at Sandia National Laboratories.
R. J. Sokel, W. H. Dodson, and M. G. Knoll.
1981, 6p
Contract AC04-76DP00789
University/government/industry microelectronics symposium, State College, MS, USA, 26 May 1981.

The nonvolatile memory program at Sandia National Laboratories is discussed with special emphasis on the relationship between technology and design. Three different MNOS technologies which have been developed for EAROM, RAM, and EEPROM applications are considered. (ERA citation 06:024035)

DE81023774 PC **A05**/MF **A01**
Bendix Corp., Kansas City, MO.
Speakeasy User's Manual.
G. C. Hynes. May 81, 87p BDX-613-2569
Contract AC04-76DP00613
Microfiche only after original copies are exhausted.

Speakeasy is an easy-to-use system of programs to manipulate primarily numerical and mathematical data for problem solving. Users access the

Speakeasy system through the IBM VM370 computer. By using language similar to standard mathematical notation and operations common to other computer disciplines, a user can formulate complex problems descriptively. This manual outlines basic operations that can be applied to many types of problem solving. A divider page outlines related functions within each section. (ERA citation 06:024822)

DE81023863 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Information and Advice on Numerical Software.
P. W. Gaffney. May 81, 212p ORNL/CSD/TM-147
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

This report contains information about available numerical routines designed to assist computer users in the solution of scientific problems. The report is organized by problem area. In each area the subroutine libraries NAG, IMSL, and HARWELL have been ranked according to how satisfactory their routines are for the problem area. This ranking is intended only to provide users with an initial order in which to search the subroutine libraries. Whenever possible, each area also contains a list of additional routines that serve to augment the capabilities of the above subroutine libraries. These routines are described in detail and, where appropriate, advice is given on their correct use. Information on how to access the routines and the subroutine libraries at Oak Ridge is provided in a series of appendices. (ERA citation 06:024828)

DE81024153 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Experiments with LSODE on the Cray.
M. E. Burnham. Apr 81, 8p UCID-19067
Contract W-7405-EN-48
Microfiche only after original copies are exhausted.

LSODE is a general purpose solver for systems of ordinary differential equations. This memo discusses the use of LSODE on the Cray under the CIVIC and CFT compilers with attempts to improve efficiency. (ERA citation 06:024832)

DE81025010 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Distributed Computing Gateway (DCG) Conceptual Design.
R. C. Hall, D. A. Harvey, and J. E. Jensen. Apr 81, 43p SAND-81-0862
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Several modifications to the Sandia National Laboratories' current scientific Central Computing Facility (CCF) are planned. These modifications include development of a Central Computing Network (CCN) and a dispersed Distributed Computing Network (DCN). It is necessary to develop a gateway between thse two networks. This connection will permit distributed processors in the DCN to gain access to the data link, various support nodes, and the worker computers in the CCF. This document describes the conceptual design for the required gateway. It provides a general description of the hardware and software necessary to implement the gateway. (ERA citation 06:024829)

DE81025012 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Construction of Integer-Vector Library Routines for the Cray Computer.
J. N. Rogers, and T. P. Tooman. Apr 81, 21p SAND-81-8214
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

The development and testing of seven linear algebra utility routines for integer vectors are documented. These routines locate extreme values, and perform vector scaling and vector element summing. They are written in CAL, the assembly language on the CRAY-1S computer. By utilizing the vector processing features of that macine, they are optimized in terms of run time. Each routine has been extensively tested to ensure performance as specified. (ERA citation 06:024831)

EGG-EA-5455 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
User's Guide to ANYOLS: a Flexible Stepwise Regression Program.
C. L. Atwood. May 81, 71p
Contract AC07-76ID01570

ANYOLS is a stepwise regression program. It fits data using ordinary or weighted least squares. It selects the variables to put into the model in a stepwise way, based on F, s exp 2 , MSE (based on C/sub p/), PRESS, or a user-written subroutine. The user can define forcing priorities to influence the order of entering variables. Instead of stepwise selection, the program can also try all possible combinations of any desired subset of the variables. Automatic output for the final model in a stepwise search includes plots of the residuals, studentized residuals, and leverages; if the model is not too large, the output also includes partial regression and partial leverage plots. A data set may be re-used so that several selection criteria can be tried. Flexibility is increased by allowing the substitution of user-written FORTRAN subroutines for several default subroutines. The program is written in CDC FORTRAN 4. (ERA citation 06:022973)

LA-UR-81-1192 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
PLOT2K: A Graphics Interface to System 2000.
L. R. Creel. 1981, 6p CONF-810476-1
Contract W-7405-ENG-36
VIM 34 conference, Chicago, IL, USA, Apr 1981.

PLOT2K is a versatile tool for generating graphs from a System 2000 data base. Its chief virtue is the ease with which it can be used, modified, and developed. This makes the graphics plot accessible to a wide range of users and allows it to be altered to suit a wide range of needs. (ERA citation 06:022975)

LA-UR-81-1550 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Event-Analysis Language for High-Speed Data Acquisition.
R. A. Hardekopf, R. V. Poore, J. W. Sunier, M. Neiman, and A. Holm. 1981, 6p CONF-810523-2
Contract W-7405-ENG-36
Topical conference on computerized data acquisition in particle and nuclear physics, Oak Ridge, TN, USA, 28 May 1981.

A multiparameter data-acquisition program is described that is highly flexible and yet provides optimum machine code for each individual set of sorting conditions. An Event Analysis Language (EVAL) compiler allows the user full control over the handling of events and produces code which runs 4 to 6 times faster than a generalized program. This technique has been integrated into the Los Alamos Physics Division data acquisition system for high-speed sorting of a wide variety of input data from CAMAC or magnetic tape. The EVAL compiler is written in FORTRAN for MODCOMP computers, but can be easily modified for other systems. (ERA citation 06:024825)

N81-12776/3 PC **A08**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Automatic Scene Analysis (Analyse de Scenes Automatique).
Contract rept. no. 2.
Nov 79, 160p ENST-D-79024
Text in English and French.

Two approches were used to determine the theoretical ceil dimension or digitizing interval necessary to digitize contours. One was based on a sampling point of view the other on quantizing. However, the problem remains and there is no clear indication of this distance. In this paper an attempt is made to give a satisfactory formulation based on discrete geometric properties.

N81-26745/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Algorithm and Program for Information Processing with the Film Apparatus.
L. S. Gurin, V. S. Morkrov, Y. I. Moskalenko, and K. A. Tsoy. Sep 79, 20p NASA-TM-75704, PR-316
Contract NASW-3198
Transl. Into English of "Algoritm I Programma Obrabotki Informatsii S Probora Filin" Moscow, Rept. Pr-316, 1977 p 1-18. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Academy of Sciences, Moscow.

The reduction of spectral radiation data from space sources is described. The algorithm and program for identifying segments of information obtained from the Film telescope-spectrometer on the Salyut-4 are presented. The information segments represent suspected X-ray sources. The proposed algorithm is an algorithm of the lowest level. Following evaluation, information free of uninformative segments is subject to further processing with algorithms of a higher level. The language used is FORTRAN 4.

N81-26748/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Software Engineering Standards and Practices.
R. W. Durachka. Jun 81, 49p NASA-TM-82148

Guidelines are presented for the preparation of a software development plan. The various phases of a software development project are discussed throughout its life cycle including a general description of the software engineering standards and practices to be followed during each phase.

N81-26749/4 PC **A99**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Detection and Mapping (DAM) Package. Volume 4A: Software System Manual, Part 1.
Final Report, Jan. - Sep. 1980.
E. H. Schlosser. Sep 80, 668p NASA-CR-161013, LEMSCO-15615-PT-1
Contract NAS9-15800

The package is an integrated set of manual procedures, computer programs, and graphic devices designed for efficient production of precisely registered and formatted maps from digital LANDSAT multispectral scanner (MSS) data. The software can be readily implemented on any Univac 1100 series computer with standard peripheral equipment. This version of the software includes predefined spectral limits for use in classifying and mapping surface water for LANDSAT-1, LANDSAT-2, and LANDSAT-3. Tape formats supported include X, AM, and PM.

N81-26750/2 PC **A99**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Detection and Mapping (DAM) Package. Volume 4B: Software System Manual, Part 2.
Final Report.
E. H. Schlosser. Sep 80, 721p NASA-CR-161014, LEMSCO-15616-PT-2
Contract NAS9-15800

Computer programs, graphic devices, and an integrated set of manual procedures designed for efficient production of precisely registered and formatted maps from digital data are presented. The software can be used on any Univac 1100 series computer. The software includes pre-defined spectral limits for use in classifying and mapping surface water for LANDSAT-1, LANDSAT-2, and LANDSAT-3.

PB81-216699 Not available NTIS
National Bureau of Standards, Washington, DC.
ANS FORTRAN: Past and Near Future.
Final rept.,
G. Lyon. 1980, 3p
Proceedings of the International Computer Technology Conference ASME Century 2--Emerging Technology Conferences held at San Francisco, CA., on August 12-15, 1980.
Paper in Advances in Computer Technology-1980, n2 p402-404 1980.

Although the essential design of FORTRAN was made over twenty-five years ago, the language will persist. A large community supports its use and it is widely available. FORTRAN will remain viable because of this availability because of an uncom-

plicated and malleable nature, and because of evolutionary improvements.

PB81-219206 PC **E03**/MF **A01**
Federal Compiler Testing Center, Falls Church, VA.
Data General Corporation AOS Cobol Revision 3.10.
Validation summary rept.
15 Jun 81, 50p CCVS74-VSR775

The Validation Summary Report (VSR) for the Data General AOS COBOL Compiler Version 3.10 (AOS Version 3.39) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies be level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-219214 PC **E03**/MF **A01**
Federal Compiler Testing Center, Falls Church, VA.
Computer Sciences Corporation CSTS 74 Cobol, Version COB230.
Validation summary rept.
15 Jun 81, 68p CCVS74-VSR790

The Validation Summary Report (VSR) for the Computer Sciences Corporation CSTS 74 COBOL Compiler Version COB230 (CSTS Version SYS200) provides a consolidated summary of the results obtained from the validation of the suject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the High level of FIPS PUB 21-1). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies be level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-219222 PC **E03**/MF **A01**
Federal Compiler Testing Center, Falls Church, VA.
NCR Corporation NCR IRX Cobol, Release 4.0.
Validation summary rept.
15 Jun 81, 49p CCVS74-VSR785

The Validation Summary Report (VSR) for the NCR Corporation IRX COBOL Compiler Version 4.0 (NCR IRX Version 4.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies be level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-219230 PC **E02**/MF **A01**
Federal Compiler Testing Center, Falls Church, VA.
NCR Corporation NCR IRX Cobol, Release 4.0 Indexed I-0 Module, Level 1.
Technical rept.
15 Jun 81, 10p FCTC/TR-81/18

This FCTC Technical Report for the Indexed I-O Module of the NCR Corporation IRX COBOL Compiler Version 4.0 (NCR IRX Version 4.0) provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Module of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This Technical Report is made up of several sections showing the discrepancies found. A companion report (Validation Summary Report CCVS740VSR785) provides information regarding the validation of the Compiler at the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1).

PB81-219305 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Specifications and Test Methods for Numeric Accuracy in Programming Language Standards.
Final rept.,
John V. Cugini. Jun 81, 42p NBS-SP-500-77, NBS/SP-500-77
Library of Congress catalog card no. 81-600056.

The publication formulates language-independent and machine-independent criteria for assessing the quality of floating-point arithmetic operations and functions. The criteria require that results be within the limits generated by perturbing the arguments or operands by a specified amount, and thus allow for the mathematical instability of some functions at certain arguments and also for the granularity of numeric representation inherent in digital machines. Automatic test methods derive naturally from the accuracy requirements. Model algorithms for testing are included.

PB81-222887 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A PASCAL System for Interdata Computers.
Special rept.,
Jean Jobson, and Hester van Rooyen. May 80, 36p SWISK-15, ISBN-0-7988-1891-3

The report forms the manual for the PASCAL4A system currently running on the Interdata 7/32 computer and consisting of a compiler, an assembler and an interpreter. Several features of the PASCAL language as implented by the PASCAL4A system are described, and it is explained how the system is used.

PB81-223430 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC.
NBS Programming Environment Workshop Report.
Final rept.,
Martha A. Branstad, and W. Richards Adrion. Jun 81, 109p NBS-SP-500-78
Library of Congress catalog card no. 81-600068.

In May of 1980, NBS hosted a workshop to assess the state-of-the-art in programming environment technology and to determine the key questions and issues that must be addressed to use these techniques to improve software quality and productivity within the Federal Government. This document reports the results of the workshop.

SAND-81-0994 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Local Design Specifications for the CCN Security Controller (SC).
W. P. Bennett, and L. C. Jones. Apr 81, 33p
Contract AC04-76DP00789

This is a description of the preliminary local design specifications of the Central Computing Network Security Controller. The external interface to the Central Computing Network is not described, but the functions and services to be provided are included as justification for the local design. (ERA citation 06:022977)

UCID-18649 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
DOE Workshop on Design Automation and Computer-Aided Design: Abstracts.
1980, 44p CONF-8006166-
Contract W-7405-ENG-48
Workshop on design automation and computer aided design, Livermore, CA, USA, 10 Jun 1980.

The aims and objectives in organizing this two-day workshop were to discuss the needs, activities, and plans for design automation (DA) and computer-aided design (CAD) of engineering systems within the DOE laboratories and major DOE contractors. The intent has been to provide a forum to exchange information and ideas and to foster DA/CAD communications among DOE laboratories and contractors. It is hoped that by sharing experiences and future plans the DOE community will be better able to identify problem areas so that research and development in DA and CAD can be better organized, supported, and made available. Abstracts of 30 papers given at the workshop are presented. (ERA citation 06:022978)

UCRL-83791(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Verification of Timing Constraints on Large Digital Systems.
T. M. McWilliams. 7 Apr 80, 10p CONF-800622-2(Rev.1)
Contract W-7405-ENG-48
17. design automation conference, Minneapolis, MN, USA, 23 Jun 1980.

A new approach to the verification of the timing constraints on large digital systems has been developed. The associated algorithm is computationally very efficient, and provides early and continuous feedback about the timing aspects of synchronous sequential circuits as they are designed. It also provides means for conveniently verifying the design in sections, permitting the section-by-section timing verification of designs which are too large to examine as a unit on existing computer systems. A system using this algorithm has been implemented, and has been used to verify the timing constraints on the design of the S-1 Mark IIA processor. (ERA citation 06:022981)

UCRL-84964 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Computer-Aided Design Drafting/Manufacturing (CADD/M) Facility Preparation.
F. J. Norton. 23 Sep 80, 16p CONF-8009151-4
Contract W-7405-ENG-48
Annual ADUA meeting, Denver, CO, USA, 30 Sep 1980.

Computer-Aided Design, Drafting and Manufacturing (CADD/M) equipment requires careful facilities preparation before installation takes place. This paper presents what a company should consider to ensure a proper installation. This includes consideration of working conditions. To get the most out of the system, the operators must be provided with a relaxed, comfortable environment, free from noise and other distractions. Such things as temperature requirements, lighting, power, security and fire protection are discussed. Also, future expansion needs are considered so that major construction will not be required for future years. Advanced planning in these areas is needed to ensure successful implementation of a CADD/M system. This will lead to considerable cost savings, and in the long run, improve the scheduling for an entire project, from initial design to final production. This careful preparation will minimize unplanned events and problem areas. These are ambitious goals but easily realized if a logical and rational plan is adopted in the same manner as that used in a typical development program. (ERA citation 06:022982)

UCRL-84965 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Selecting and Implementing an Interactive Computer Aided Design Drafting/Manufacturing (CADD/M) System.
F. J. Norton. 23 Sep 80, 54p CONF-8009151-3
Contract W-7405-ENG-48
Annual ADUA meeting, Denver, CO, USA, 30 Sep 1980.

Success with Interactive Computer-Aided Design Drafting/Manufacturing (CADD/M) depends upon management, users, and the system itself. If you are in a design and drafting environment, the thought of acquiring a CADD/M system will probably occur to you sometime in the very near future - if it hasn't already. Convincing yourself and your management of the benefits of such systems is but the first step. Evaluating and selecting one particular type of CADD/M system can turn out to be a complicated undertaking - not to mention somewhat frustrating. Procedures for selecting and successfully implementing a CADD/M system are outlined. INITIAL PREPARATION examines the techniques used to evaluate CADD/M systems including formation of an evaluation team, and application analysis. GRAPHICS EVALUATION describes

the methods that can be used to test a CADD/M system, including benchmark drawings and specifications, human engineering considerations, and other evaluation criteria and general system configurations are also discussed. COMPUTER SYSTEM EVALUATION examines other factors in systems selection: programming, communications, documentation, and service. SYSTEM STARTUP addresses site preparation, people preparation, system acceptance, and operator, designer/drafter selection. Finally, operator, designer/drafter TRAINING and SYSTEM MANAGEMENT are discussed. This systematic approach wil help those contemplating the acquisition of CADD/M systems for their activities and will help minimize unplanned events and problem areas.Advanced planning in these areas is needed to ensure successful implementation of a CADD/M system. This in turn will lead to considerable cost savings and schedule improvements for an entire project, from initial design to final production. These are ambitious goals but easily realized if a logical and rational plan is adopted in the same manner as that used in a typical development program. (ERA citation 06:022983)

UCRL-84966 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Cost Justification for an Interactive Computer-Aided Design Drafting/Manufacturing System.
F. J. Norton. 23 Sep 80, 23p CONF-8009151-2
Contract W-7405-ENG-48
Annual ADUA meeting, Denver, CO, USA, 30 Sep 1980.

Many factors influence the capital investment decision. System costs and benefits are weighed by methods of financial analysis to determine the advisability of an investment. Capital, expense, and benefits as related to Interactive Computer-Aided Design Drafting/Manufacturing (CADD/M) Systems are discussed and model calculations are included. An example is treated by the simple payback method and the more sophisticated methods of Net Present Value (NPV) and Internal Rate of Return (IRR). The NPV and IRR approaches include in the calculation the time value of money and provide a sounder foundation on which to base the purchase decision. It is hoped that an understanding of these techniques by technical personnel will make an optimum system purchase more likely. (ERA citation 06:022984)

9C. Electrical and Electronic Engineering

AD-A100 797/0 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Effects of a Pulse-Forming Network Operating into a Non-Linear Load.
Master's thesis,
Edward Jacob Keefer, Jr. 15 Mar 81, 76p Rept no. AFIT/GE/EE/81M-4

The power modulator of an electron-beam gun was computer modeled to investigate the performance of a pulse-forming network (PFN). The PFN was designed for a constant matched load but operated into non-linear load. The power modulator's operation consisted of: pulsing the electron-beam gun's cathode to a negative 220KV, thru a pulse transformer, by a 50KV hard-tube pulser, this pulser was switched by four parallel power triodes, which were driven by a line type pulser or PFN. The triodes, the PFN's load, exhibited a non-linear impedance dependent on their grid and plate voltages. The computer model was used to examine the effects of the non-linear load of the power tubes on the PFN. The PFN as constructed in four; 12KV, 10 sec modules. It was possible to add or remove these modules from the PFN to change the pulse width in 10 sec steps. This modular PFN design was first investigated using a digital computer model and then built and tested for a constant load. Then the effect of operating into a non-linear was examined by modeling the PFN within the power modulator. (Author)

AD-A101 027/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Weighted-Average frequency Tracker.
Journal article,
Shou Y. Mui. 30 Nov 80, 11p MS-5206A, ESD-TR-81-57
Contract F19628-80-C-0002
Pub. in Proceedings of the National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p38.5.1-38.5.10 1980.

No abstract available.

AD-A101 053/7 PC **A10**/MF **A01**
Texas Tech Univ., Lubbock. Inst. for Electronic Science.
Nonlinear Fault Diagnosis,
R. -W. Liu, K. Nakajima, P. Olivier, Quoc Ding Ngo, and R. Saeks. May 81, 204p
Prepared in cooperation with Notre Dame Univ., IN, Dept. of Electrical Engineering.

A summary of several research projects in the nonlinear fault diagnosis is given. Several alternative algorithms for the solution of the nonlinear fault diagnosis problem are presented, together with a diagnosibility theory, and a set of criteria which an 'ideal' fault diagnosis problem should strive to meet. (Author)

DOE/ET/20279-138 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Effect of Electrical-Utility-System Voltage Harmonics on Induction Motors.
N. E. Rasmussen. Mar 81, 6p
Contract AC02-76ET20279

Distortion of the electrical utility system voltage waveform can result in damage to or malfunction of user electrical equipment. An experiment was carried out to determine the effect of utility voltage harmonics on the temperature rise of single-phase induction motors. The results suggest that utility voltage harmonics do not significantly affect the operating temperature of a single-phase induction motor until the amplitudes of the harmonics are much larger than the amplitudes currently present in the US utility system. (ERA citation 06:021819)

DOE/ET/29068-T5 PC **A03**/MF **A01**
Westinghouse Electric Corp., Trafford, PA. Power Circuit Breaker Div.
Evaluation, Design, Development and Delivery of a 1200-KV Prototype Termination. Ninth Technical Progress Report, December 1, 1980-February 28, 1981.
J. S. Billings, and W. H. Fischer. 30 Apr 81, 26p
Contract AC01-78ET29068

Tests are continuing on the shatter-resistant weathercase models and small samples. Two epoxy weathercase material samples are still undergoing accelerated tensile creep tests. Progress is reported on the design of the full scale prototype termination. (ERA citation 06:022012)

PB81-216483 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Speed Control of a Field-Controlled DC Motor by Probability Maximization,
M. Pachter, and Y. Yavin. Mar 80, 27p TWISK-139

The method of direct maximization of the probability of hitting a target set within a specified time is applied to the problem of designing a feedback speed controller for a field-controlled DC motor. Specifically, the optimal feedback control and the pertinent probabilities are computed. In addition, the limiting case of small disturbances is analyzed.

9D. Information Theory

AD-A100 976/0 PC **A06**/MF **A01**
Texas Univ. at Austin. Applied Research Labs.
Statistical Characteristics of Power Spectrum Estimates Derived from Higher Resolution FFT'.
Technical rept.,
Clark S. Penrod. 21 May 81, 109p Rept no. ARL-TR-81-26
Contract N00039-79-C-0306

This report documents an investigation of the properties of a technique used to reduce the resolution of a power spectrum estimate. The technique investigated is the familiar one in which averaging across frequency is performed on a spectrum estimate to produce an estimate which has less resolution, but improved stability. Results are presented in various areas. Primarily, the statistical nature of a reduced resolution spectrum produced in this way is characterized by the derivation of expressions for equivalent degrees of freedom. In addition, the associated spectral windows are determined, and examples are shown which illustrate the effect on the spectrum estimate of various uniform and non-uniform weighting schemes in the frequency averaging. Finally, a particular weighting scheme is shown which produces results which closely approximate the lower resolution estimate obtained by conventional means with the Hanning window. (Author)

AD-A101 003/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Soft Decision Decoding for PPM Optical Channels with Direct Detection.
Journal article,
Vincent W. Chan. 1980, 9p MS-5207A, ESD-TR-81-58
Contract F19628-80-C-0002
Pub. in Proceedings of National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p57.4.1.-57.4.8.

No abstract available.

AD-A101 029/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Signal Reconstruction from Phase or Magnitude.
Journal article,
Monson H. Hayes, Jae S. Lim, and Alan v. Oppenheim. 14 Sep 79, 10p JA-4995, ESD-TR-81-67
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing vASSP-28 n6 p627-680 Dec 80.

No abstract available.

AD-A101 166/7 PC **A03**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
A Nonlinear Maximum Entropy Method for Spectral Estimation.
Final rept. 1 Mar 80-30 Apr 81,
C. H. Chen. 30 Apr 81, 50p SMU-EE-TR-81-8, AFOSR-TR-81-0528
Grant AFOSR-80-0143

An intensive research study is made of the nonlinear maximum entropy spectral analysis method proposed by P.F. Fougere of AFGL. The research not only provides a much better understanding of the properties of the method including spectral resolution, convergence, etc. but also shows that the method can be performed effectively with the PDP 11/45 minicomputer. The successful implementation of the method is described in the program listings in Appendix I. Extensive computer results are presented on various data. These results clearly confirm that the nonlinear method is superior to the Burg's maximum entropy spectral analysis. Preliminary results on the multichannel (multivariate) maximum entropy spectral analysis, the two-dimensional maximum entropy spectral analysis, and computer graphics for the spectral display are also presented. An extensive bibliography of the maximum entropy spectral analysis is given in Appendix III. (Author)

9E. Subsystems

AD-A100 583/4 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Demonstration of the Use of VLSI Design Rules, Standards, and Interfaces.
Research and development status rept. 1 Jun-1 Sep 80,
Carver Mead. 1 Sep 80, 6p
Contract N00014-79-C-0924, ARPA Order-3771

Topics reported include: Task 1--Consultation from fabrication lines, CMOS-SOS and NMOS-Si gate test-chips, Geometrical design rules, Speed and timing rules, and Testability rules; and Task 2--CIF/APPLICON, CALMA conversion software, and Circuit design.

AD-A100 584/2 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Demonstration of the Use of VLSI Design Rules, Standards, and Interfaces.
Reaserch and development status rept., 1 Sep-1 Dec 80,
Carver mead. 1 Dec 80, 4p
Contract N00014-79-C-0924, ARPA Order-3771

For complete abstract, see AD-A100 583.

AD-A100 585/9 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Demonstration of the Use of VLSI Design Rules, Standards, and Interfaces.
Research and development status rept. 1 Dec 80-1 Mar 81,
Carver Mead. 1 Mar 81, 4p
Contract N00014-79-C-0924, ARPA Order-3771

For complete abstract, see AD-A100 583.

AD-A100 591/7 PC **A03**/MF **A01**
Ohio State Univ., Columbus. ElectroScience Lab.
Eigenfunctions of Hermitian Iterated Operators with Application to Discrete and Continuous Radiating Systems.
Technical rept.,
Naoki Inagaki, and Robert J. Garbacz. Jan 81, 41p Rept no. ESL-712695-1
Contract N00014-78-C-0049

In this report we study some properties and applications of Hermitian operators formed by the iteration of any given operator with its adjoint. Such a given operator might arise in array and aperture antenna theory and, as shown in examples, the eigenfunctions of the corresponding Hermitian iterated operator can be used to maximize power transferred from an array to a point, or from one aperture to a second aperture. Constraints, such as a normed power source radiating into a specified sector of space, may be incorporated into the theory as well, as illustrated by an example. The eigencurrents and fields of Hermitian iterated operators associated with perfectly conducting bodies are introduced and contrasted with the characteristic currents and fields of Garbacz, Harrington, and Mautz.

AD-A100 596/6 PC **A02**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
GaAs IGFET Digital Integrated Circuits.
Technical rept.,
Fritz L. Schuermeyer. 30 May 80, 7p Rept no. AFWAL-TR-81-1124
Pub. in IEEE Transactions on Electron Devices, vED-28 n5 p541-545 May 81.

No abstract available.

AD-A100 628/7 PC **A03**/MF **A01**
JAYCOR, Alexandria, VA.
Analysis of a Broadband Cerenkov Amplifier.
Final rept. 1 Aug 78-31 Jan 80,
John Vomvoridis, and Robert Smith. 6 Mar 80, 26p Rept no. JAYCOR-PSD-200-80-001-FR
Contract N00014-78-C-0613

In the past several years, there has been widespread interest in a variety of wave generation devices based on un-neutralized beams of relativistic or mildly relativistic electrons. Such devices are potentially capable of producing high power, with high efficiency, in the centimeter, millimeter, and sub-millimeter spectral ranges. An example is the electron cyclotron maser, which has produced approximately 100 kW at centimeter wavelengths, with efficiencies ranging from 30% - 50%. The gyrotron mechanism involves azimuthal phase bunching of the electron beam, which occurs during resonant interaction of the Doppler-shifted beam cyclotron mode with a waveguide or cavity mode. The bandwidth of the gyrotron mechanism is typically of order 1-2%. For various military and communications applications, it could be of great interest to develop free-electron amplifiers with wide operating bandwidths. In this report, we present a linear analysis of a new principle for wideband amplification. The basic configuration is the use of an annular electron beam drifting in a dielectrically-loaded waveguide. In such a waveguide, the normal guide modes have phase velocities asymptotic of the speed of light the square root of the dielectric constant. The system is assumed to be immersed in an axial magnetic field sufficiently strong to render the motion of the beam electrons one-dimensional. In this case, the amplification mechanism depends on axial charge bunching in the Cerenkov interaction of a longitudinal space-charge wave of the beam with the Ez - component of a TM guide mode.

AD-A100 699/8 PC **A03**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Conformal and Small Antenna Designs.
Technical rept.,
Howard S. Jones, Jr. Apr 81, 32p Rept no. HDL-TR-1952

Select antennas are described that can be used effectively on conformal surfaces. Most of these antennas are compact, are electrically and physically small, and can be easily integrated into conical and cylindrical bodies. Edge-slot, microstrip, and dielectric rod radiator design techniques are employed in the development of these antennas. Critical design parameters, modes of radiation, empirical data, and theoretical considerations are discussed. The intrinsic properties and characteristics of selected dielectric materials are considered. (Author)

AD-A100 741/8 PC **A04**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Application of Filters for High-Altitude Electromagnetic Pulse Protection.
Technical memo.,
Gary L. Roffman. Apr 81, 53p Rept no. HDL-TM-81-9
Contract MIPR-HC1001-9-400

The application of filters for the protection of electrical equipment from electrical transient signals induced by high-altitude electromagnetic pulse (HEMP) is discussed, and the application of filters to ac and dc power supplies and analog and digital signal inputs is described. The application of filters is demonstrated for different types of filters; also shown are filter limitations caused by arching, source and load impedance mismatches, saturation, and parasitic reactances. The use of filters following a nonlinear terminal protection device (TPD) is shown to be a very effective means of transient energy reduction. Magnetic cores and ferrite beads can provide a simple method of high-frequency transient suppression. (Author)

AD-A100 757/4 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Theory of A Wideband Distribution Gyrotron Travelling Wave Amplifier.
Memorandum rept.,
K. R. Chu, Y. Y. Lau, L. R. Barnett, and V. L. Granatstein. 23 Jun 81, 26p Rept no. NRL-MR-4455

We present the concept of an ultra-wideband distributed gyrotron travelling wave amplifier for millimeter and submillimeter waves. The radius of the waveguide in the interaction region is increased along the axis while the strength of the d.c. magnetic field is decreased in such a way that the wave cutoff frequency is kept nearly equal to the electron cyclotron frequency. The basic principle of operation, peak gain, and saturated efficiency are analyzed. It is shown that instantaneous bandwidth over at least two octaves is theoretically possible. Technological requirements for achieving such an amplifier are assessed, including proposed structures for distributed input wave coupling. (Author)

AD-A100 780/6 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of Linear Phase, Finite Impulse Response, Two-Dimensional, Digital Filters.
Master's thesis,
David Ciccolella. Dec 80, 158p Rept no. AFIT/GE/EE/80D-13
Availability: Microfiche copies only.

An interactive computer program was developed that enables the user to design linear phase, finite impulse response, linear shift-invariant, two-dimensional digital filters. The program user can design lowpass, highpass, bandpass, bandstop, all-pass, and multiband two-dimensional digital filters. The filters designed by using the program are nearly optimal in the Chebyshev sense. The technique implemented in the program consists of transforming a one-dimensional digital filter into a two-dimensional digital filter by a change of variables. This technique was first proposed by James H. McClellan and is called the McClellan Transformation. The program user can elect to utilize either the first order or the second order McClellan Transformation to design a two-dimensional digital filter.

AD-A100 876/2 Not available NTIS
North Carolina State Univ. at Raleigh. Dept. of Electrical Engineering.
H-Plane Coupling between Rectangular Microstrip Antennas,
C. M. Krowne, and A. R. Sindoris. 24 Jan 80, 5p ARO-16295.6-EL
Grant DAAG29-79-G-0023
Availability: Pub. in Electronics Letters, v16 n6 p201-240, 13 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A101 001/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
An Iterative Implementation for 2-D Digital Filters.
Journal article,
Dan E. Dudgeon. 3 Jul 79, 7p JA-4992, ESD-TR-81-66
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-28 n6 p666-671 Dec 80.

No abstract available.

AD-A101 032/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
High-Performance Quasi-Optical GaAs Monolithic Mixer at 110 GHz.
Journal article,
Brian J. Clifton, R. Allen Murphy, Gary D. Alley, and Isabel H. Mroczkowski. 9 Jul 80, 4p JA-5135, ESD-TR-81-70
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Electron Devices vED-28 n2 p155-157 Feb 81.

No abstract available.

AD-A101 129/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Thinned Array Configurations for Use with Satellite-Based Adaptive Antennas.
Journal article,
Joseph T. Mayhan. 17 Feb 80, 12p JA-5092, ESD-TR-81-30
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Antennas and Propagation, vAP-28 n6 p846-856 Nov 80.

No abstract available.

AD-A101 178/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

Adaptive Main-Beam Nulling for Narrow-Beam Antenna Arrays.
Journal article,
Roy N. Adams, Kenneth D. Senne, and Larry L. Horowitz. 12 Sep 79, 9p JA-5031, ESD-TR-81-23
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Aerospace and Electronic Systems, vAES-16 n4 p509-516 Jul 80.Presented at the Workshop on Applications of Adaptive Control, Aug 79, New Haven, CT.

No abstract available.

AD-A101 180/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Convergence Rate of the Extended SMI Algorithm for Narrowband Adaptive Arrays.
Journal article,
Larry L. Horowitz. 26 Nov 79, 4p JA-5047, ESD-TR-81-24
Contract F19628-80-c-0002
Pub. in IEEE Transactions on Aerospace and Electronic Systems, vAES-16 n5 p738-740 Sep 80.

No abstract available.

DE81023749 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Computer Aids for Integrated Circuit Design at Sandia National Laboratories.
G. W. Brown. 1981, 6p SAND-81-1320C, CONF-810623-3
Contract AC04-76DP00789
24. midwest symposium on circuits and systems, Albuquerque, NM, USA, 29 Jun 1981.
Microfiche only after original copies are exhausted.

A general framework for a hierarchical computer-aided design (CAD) system for VLSI design is described. The system supports both functional and physical design in the areas of initial design specification, system synthesis, simulation, mask layout, verification, and documentation. The system is being implemented in phases within a user environment on a DECsystem 20-VAX 11/780 computer network. It supports evolutionary changes as new technologies, design strategies, and application programs are developed. (ERA citation 06:024036)

LA-UR-81-1126 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Nanosecond-Gating Properties of Proximity-Focused Microchannel-Plate Image Intensifiers.
N. S. P. King, G. J. Yates, S. A. Jaramillo, J. W. Ogle, and J. L. Detch, Jr. 1981, 22p CONF-810429-18
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

Some fundamental properties of 18-mm-diam gated proximity-focussed microchannel-plate (MCP) image intensifiers used as fast image shutters in the 1 to 10 ns range have been identified and studied. Light pulses (approx. 5 ps wide) from a modelocked dye laser optically sample the gated MCP. Shuttering is achieved by applying a forward-biasing electrical gate pulse to the quiescently reverse-biased photocathode-MCP interface. Variable delay (approx. 30 ps jitter) between the gate pulse and the laser pulse permits tracing the MCP's optical response. Gating speeds, turn-on and turn-off patterns, the asymmetric spatial dependence of the MCP optical response, and resolution effects as functions of gate pulse width and photocathode-MCP bias have been characterized. Shutter times of >750 ps with approx. 5 1p/mm resolution were observed. Variations in the intensity profiles of the phosphor's spatial response for uniform photocathode illumination are measured with a calibrated silicon-intensified-target (SIT) focus projection, scan (FPS) television camera and a high-speed video digitizer while photomultipliers monitor the laser pulse and the phosphor's spatially integrated output intensities. The characterization system, gating and biasing circuits, and experimental results will be presented. (ERA citation 06:022520)

PAT-APPL-6-230 850 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Photoelectrochromic Display Device.
Patent Application,
Allen J. Bard. Filed 2 Feb 81, 12p AD-D008 554/8
Availability: this Government-owned invention available for U.S. licensing, and possibly, for foreign licensing. Copy of application available NTIS.

A photoelectrochromic display device having a semiconductor electrode, and a counterelectrode made of a selected metallic material is presented. The electrode and counterelectrode are immersed in an aqueous solution containing heptyl viologen. The device is usable as a display device, as a storage battery, and as an alternating current photoelectric generator. As a display device, the cell requires only two leads rather than multiple leads and complicted electrical addressing and decoding required for most multi-character displays. (Author)

PAT-APPL-6-237 020 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Cylindrical Microwave Lens Antenna for Wideband Scanning Applications.
Patent Application,
Walter Rotman. Filed 23 Feb 81, 34p AD-D008 526/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The bandwidth limitation in space fed phased arrays (that results from the use of phase shifters to implement beam steering) is overcome by a lens arrangement in which independent feeds are provided at the focal plane of the lens. Each feed generates a collimated beam in a different spatial direction. Each beam can then be steered about its central position by means of phase shifters, while retaining a substantially improved bandwidth. An algorithm is derived for designing three-dimensional (3D) microwave lenses with line source feeds by stacking a number of identical two-dimensional (2D) parallel-plate, wide-angle constrained lenses into a cylindrical antenna structure. This lens design provides focused beams over a wide range of scan angles in both elevation and azimuth with only small optical aberration. A wide variety of lens designs can be achieved through this algorithm, dependent upon the constraints which are selected for the 2D lens counterpart. For one design, where all the transmission line lengths in the lens are made equal, the phase errors for beam scanning in the plane containing the cylindrical axis of the antenna are less than their broadside values, regardless of scan angle. This permits wide-angle coverage in both elevation and azimuth from a single lens with both good beam and quality and bandwidth. (Author)

PAT-APPL-6-239 955 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
A Broad Bandwidth Surface Acoustic Wave Filter Apparatus with Staggered Tuning.
Patent Application,
Roger D. Colvin. Filed 3 Mar 81, 22p AD-D008 526/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A broad bandwidth surface acoustic wave filter utilizing two broadband surface acoustic wave transducer pairs which indivudually comprise a single input and output. One pair of broadband surface acoustic wave (SAW) transducers is offset in frequency from a second pair of broadband SAW transducers. Each transducer is tuned with a single series inductor, and then both channels are connected electrically in parallel. The low frequency pair of transducers is tunned for maximum response below their snychronous frequency, and the high frequency pair of tranducers is tuned for maximum response above their synchronous frequency. (Author)

PAT-APPL-6-254 353 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Adaptive Feed-Forward System.
Patent Application,
Ronald M. Bauman. Filed 14 Apr 81, 20p AD-D008 552/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A feed-forward system is given for reducing the distortion products from a device such as an amplifier, wherein a sample of the device input signal is subtractively combined with a sample of the device output signal to produce a sample of the distortion products. The distortion sample is adjusted in amplitude and phase and subtractively combined with the device output to produce a distortion-reduced system output. A synchronous detector correlates a sample of the system output, in which the proportion of distortion has been increased, with another sample of the distortion products to produce control signals for a modulator which adaptively adjusts the amplitude and phase of the distortion sample subtractively combined with the device output. (Author)

PAT-APPL-6-255 121 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Active Dielectric Waveguide Amplifier or Oscillator Using a High Density Charged Particle Beam.
Patent Application,
Charles M. DeSantis, and Louis J. Jasper, Jr.
Filed 17 Apr 81, 15p AD-D008 537/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A circuitless particle beam device for relatively high frequency amplifier or oscillator applications that eliminates the requirement for an internal RF slow wave structure. A circularly polarized RF energy wave propagates on a relatively high density particle beam within an oversized wageguide and interacts with the beam which exhibits a relatively high dielectric constant. The high density beam acts as an active dielectric waveguide serving the dual purpose of a slow wave circuit and amplification source, and accordingly guides and amplifies the RF energy when a condition of beam and wave synchronism is met. (Author)

PB81-217457 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Production of Complex Systems with Integrated Electronic Circuitry with Lot Size Less Than 10,000 Circuits per Year. Some Requirements and Suggested Directions (Tillverkning av Komplexa System med Integrerad Elektronik vid Seriestorlekar Mindre aen 10 000 Kretsar per Ar. Nagra Behov Samt Foerslag till Arbetsinriktning),
Rolf Helgodt. Aug 80, 25p FOA-C-30198-E1
Text in Swedish, Abstract in English.

The desire or necessity often arises in both military and nonmilitary sectors of modifying existing equipment or designing new devices using highly specialized integrated circuitry. In many cases this proves to be impossible since the design phase is extremely costly and production of over 100,000 pieces would be necessary to justify production economically. This is generally not possible for such diverse purposes as airplanes, rockets, telephone stations, and extremely advanced, specialized measuring devices. The present report examines these problems as they are related to the production of equipment for the Swedish military, as well as for current projects in the United States.

PB81-807083 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Phase Arrays. March, 1976-May, 1981 (Citations from the NTIS Data Base).
Rept. for Mar 76-May 81.
Jul 81, 323p
Supersedes PB80-808041, and NTIS/PS-79/0411.

The design, performance, radiation patterns, and applications of phased arrays are presented in these Federally-sponsored research reports. Applications include communications, radar, optical, spacecraft, and navigational aids. (This updated bibliography contains 318 citations, 74 of which are new entries to the previous edition.)

PB81-807091 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Phased Arrays. 1978-June, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1978-Jun 81.
Jul 81, 250p
Supersedes PB80-808058, and NTIS/PS-79/0413.

The bibliography cites reports from worldwide research on the design, performance, radiation patterns, and applications of phased arrays. Applications include radar, communications, optical, electronic countermeasures, acoustic, aircraft, and spacecraft. (This updated bibliography contains 246 citations, 89 of which are new entries to the previous edition.)

9F. Telemetry

AD-A101 110/5 PC **A03**/MF **A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
The Pop-Up Buoy (PUB).
Technical rept.,
John M. Dahlen, Narender K. Chhabra, Frank J. Siraco, and William E. Toth. Jun 81, 47p Rept no. R-1480
Contract N00014-75-C-0291

The Pop-Up Buoy (PUB) was conceived as a practical means to implement a real-time telemetry link between a satellite and instruments beneath the ocean surface. It is a self-contained module, tethered to a moored subsurface buoy, and capable of propelling itself up and down between the ocean surface and a submerged rest station. Most of its life is spent submerged, secure from storms and surface traffic, while storing data sent from remote sensors via an acoustic link. At pre-determined times of satellite passage, it rises to the surface for a brief transmission. If a storm is sensed by pressure fluctuations the transmission can be postponed or cancelled. Typical low data rates, e.g., only 3000 bits every 3 days in the acoustic tomography application, can be handled with infrequent transmissions. Energy for propulsion is then so small that a two-year life system may be packaged in a compact unit. A PUB sized for tomography has the form of a 56 cm sphere with small appendages and weighs 104 Kg (230 lbs). The design of this unit is described. (Author)

10.
ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A100 837/4 PC **A04**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Electrical Energy Reduction for Army Installations.
Final rept.,
L. M. Windingland. May 81, 65p Rept no. CERL-TR-E-170

This report describes an analysis of electrical energy consumption of selected Army buildings at representative Army installations and of methods that can be used to reduce electrical consumption and associated utility costs at these installations. The report defines various techniques such as power factor correction, lighting reduction, motor voltage controllers, and the benefits derived from their application. The report shows that electrical consumption is significant when the buildings are unoccupied; in fact, the unoccupied consumption, especially in adminstration, maintenance and operations buildings, often amounts to over 60 percent of total annual consumption. It was concluded that a detailed, building-by-building electrical reduction program employing intelligent and more effective use of heating, ventilating, and air conditioning equipment scheduling, motor control, and reduced lighting will provide the most effective electrical consumption reduction. (Author)

CONF-790432-(V.1) PC **A23**/MF **A01**
Texas Univ. at Austin.
Industrial Energy Conservation Technology.
P. S. Schmidt. 1979, 545p
Contract FC01-76IR08151
Conference on industrial energy conservation technology and exhibition, Houston, TX, USA, 22 Apr 1979.

A separate abstract was prepared for each of 51 papers included in this volume, Vol. 1, of the proceedings. Twenty-one of these abstracts will appear in Energy Abstracts for Policy Analysis. (ERA citation 05:032472)

DOE/CS-0155 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Department of Energy Solar Energy Objectives, Calendar Year 1980.
Apr 80, 33p

This paper sets out the goals of the Department of Energy for calendar year 1980 with respect to the output of each of the solar energy programs authorized by Congress. The paper is organized functionally to describe the solar activities of the Department by the sector of the economy they are designed to serve. The first part sets out an overview of the Department's solar activities including the potential contribution by solar energy, the barriers to be overcome, and an aggregation of the output we expect in the calendar year 1980. The next six parts describe the Department's solar activities aimed at the six major solar-using sectors of the economy: residential, commercial, agricultural, industrial, transportation, and utilities. The eighth part summarizes the United States government's efforts to advance the international trade possibilities in solar energy. The ninth part describes the solar projects that affect more than three of the sectors described in the preceding seven parts. The appendix contains the name and telephone number of the Department of Energy official responsible for achieving each of the quarterly output objectives described in parts II through IX of the paper. The paper covers five categories of solar energy sources: (1) biomass, which includes all uses of renewable organic material either to burn directly or to convert to liquid or gas fuels; (2) solar thermal systems, including active and passive systems for collecting heat from sunlight to be used either for heating or cooling systems; (3) photovoltaic systems, which use cells of semi-conductor materials to convert sunlight directly to electricity; (4) wind-powered systems; and (5) ocean systems including ocean thermal energy conversion, salinity gradients, ocean currents, and wave energy. (ERA citation 05:033376)

DOE/CS/30278-T4 PC **A06**/MF **A01**
Florida Solar Energy Center, Cape Canaveral.
Interstate Solar Coordination Council. Final Report.
15 Feb 81, 101p FSEC-CR-81014(DO)
Contract FC02-79CS30278

The ISCC program accomplishments and future plans are reported as follows: overall activities; development of a national standards and certification program for solar collectors; development of a national organization for operating the collector certification program; review of applicability and use of solar collector rating procedures; development of a program for evaluation/testing/certification of solar systems; development of ISCC as a formal and independent organization; development of sizing and installation manual; and coordination efforts with other solar groups. (ERA citation 06:021736)

DOE/CS/40170-T1 PC **A13**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Proposed Industrial Recoverd Materials Utilization Targets for the Textile Mill Products Industry.
May 79, 286p HCP/M-1694-03
Contract AC03-78CS40170

Materials recovery targets were established to represent the maximum technically and economically feasible increase in the use of energy-saving materials by January 1, 1987. This report describes targets for the textile industry and describes how those targets were determined. (ERA citation 06:023775)

DOE/CS/60419-T1 PC **A04**/MF **A01**
National Association of Counties Research, Inc., Washington, DC.
Guide to Reducing Energy Use...Budget Costs. Volume II. Local Energy Management Program.
S. O. Brooks, E. S. Wood, S. Guenther, and T. Graves. 1979, 75p
Contract FG01-78CS60419

Information is presented to aid communities tailor an energy conservation program specifically to themselves. Existing and new buildings, procurement, employee transportation programs, street lighting systems, and energy resource recovery are discussed. Examples are given on what can and has been done in communities. (ERA citation 06:022248)

DOE/EIA/10189-T1 PC **A08**/MF **A01**
Stanford Univ., CA. Inst. for Communication Research.
Solar Diffusion in California: A Pilot Study. Consultant Report.
E. M. Rogers, D. Leonard-Barton, T. Avi-Itzhak, E. Rosa, and R. Adhikarya. Oct 79, 159p P-500-79-014
Contract FG01-79EI10189

Solar system owners and their neighbors in the San Francisco Bay Area were studied. The study determined the level of homeowner awareness about residential solar energy systems, described characteristics of consumers purchasing solar equipment (e.g. whether they represent identifiable market segments), identified major channels of communication through which solar information is effectively used, determined remaining barriers to solar use, identified needed incentives to accelerate commercialization, and assessed public attitudes toward various state and Federal government actions to increase the rate of solar energy use statewide. Issues and questions explored are being used in the development of a statewide survey of 700 homeowners in California to determine if these findings apply to residents throughout the state. (ERA citation 06:021737)

DOE/ET/15350-1 PC **A10**/MF **A01**
Biphase Energy Systems, Santa Monica, CA.
Generation of Useful Energy from Process Fluids Using the Biphase Turbine. Final Report.
N. L. Helgeson. Jan 81, 213p
Contract AC07-76ET15350

The six largest energy-consuming industries in the United States were surveyed to determine the energy savings that could result from applying the Biphase turbine to industrial process streams. A national potential energy savings of 58 million barrels of oil per year (technical market) has been identified. This energy is recoverable from flashing gas-liquid process streams and is separate and distinct from exhaust gas waste-heat recovery. The industries surveyed in this program were the petroleum chemical, primary metals, paper and pulp, stone-clay-glass, and food. It was required to determine the applicability of the Biphase turbine to flashing operations connnected with process streams, to determine the energy changes associated with these flashes if carried out in a Biphase turbine, and to determine the suitability (technical and economical feasibility) of applying the Biphase turbine to these processes. The results of this investigation are reported as: (1) a list of processes to which the Biphase turbine is adaptable, (2) a list of processes indicating the potential plant and national energy savings that could result from applying the Biphase turbine, (3) a list of the processes according to their suitability for application of the Biphase turbine. The results of energy calculations

for 22 processes (out of 383 examined) are given. The process name, type of application, stream and plant size, energy savings per plant, and potential national energy savings(technical market) are provided for each entry. These processes are listed according to their national potential energy savings. Based upon these results a suitability listing was developed which rates the processes according to their technical and economic feasibility. In addition to the potential for energy savings, capital cost, payback period, estimated market penetration, and applicability of current Biphase technology were considered in the development of this listing. (ERA citation 06:022242)

DOE/IA-0010/11 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Market Analysis.
International Energy Indicators.
R. M. Weiss. May 81, 30p

Tabulated data and graphic displays are presented for: world crude oil production for each year since 1974; OPEC crude oil production capacity; world crude oil and refined product inventory level for each year since 1975; oil consumption in OECD Countries for each year since 1975; USSR crude oil production for each year since 1975; and the free world and US nuclear electricity generation for 1973 and the current capacity. Also, tabulated data and graphic displays are included on: US domestic oil supply for each year since 1977; US gross imports of crude oil and products for each year since 1973; landed cost of Saudi crude in current and 1974 dollars; US coal trade for each year since 1975; US natural gas trade for each year since 1975; a summary of US merchandise trade for each year since 1977; and the US energy/GNP ratio in 1972 dollars. (ERA citation 06:023123)

DOE/IR/05106-T23 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Analyzing Opportunities for Energy Conservation in Municipal Fleet Management: Service Delivery Patterns, Equipment, Supply, Operations, and Maintenance. Information Bulletin of the Energy Task Force of the Urban Consortium.
1980, 39p
Contract FG02-78IR05106

Vehicle fleet management as a five-step process is portrayed and the multiple energy conservation opportunities within each step are examined. The five steps described are, configuration of service area and service delivery patterns, equipping the fleet, operating the fleet, maintaining the fleet, and supplying the fleet with fuel. A systems approach to decision making about municipal fleets is outlined. Management options, control techniques, and devices are suggested for each of the five steps. Reference is made to analytic tools which will assist in deliberating options at each of these steps. These tools are presented in a list. Four concise case studies of jurisdictions which are taking deliberate steps to reduce fuel use are presented. Key opportunities for fuel conservation are then summarized, followed by a selected bibliography, and listing of reference materials and additional resources. (ERA citation 06:022226)

DOE/TIC-1021171 PC **A06**/MF **A01**
Dane County Regional Planning Commission, Madison, WI.
Energy Conservation Manual: A Guide for Local Government Services in Wisconsin.
1979, 110p

A guide is presented to provide local decision makers and administrative personnel with a means to determine their own energy consumption patterns and a means to develop energy conservation measures in their day-to-day activities. Chapter I presents a description of the program which selected a sample of Wisconsin communities to determine their energy consumption patterns and identify priority areas for implementing energy conservation methods through the use of this guide. Chapter II provides an outline of steps on how to begin or organize a program for energy conservation. Chapter III presents a checklist of energy conservation measures by energy type and by use. Each measure was evaluated by the sample communities in terms of its potential for implementation. Chapter IV discusses the implementation efforts of the participating communities in terms of problems, difficulties, and successes of certain conservation measures. A series of appendices are included which provide samples of memorandums, resolutions, analysis procedures, technical data, etc., to assist in the details of establishing an energy conservation program and in the selection of conservation methods which are appropriate for a specific situation. (ERA citation 06:023644)

DOE/TIC-1022135 PC **A03**/MF **A01**
Market Facts, Inc., Washington, DC.
Task Assignment No. 3. Solar Audience Test Summary Report.
3 Dec 80, 39p

Audience response to a public service advertisement concerning solar energy was tested. The test was designed to answer four categories of questions: (1) what information on solar energy in general is conveyed by the advertisement. What additional information is desired; (2) what is the reaction of the respondent to specific components or characteristics of the advertisment; (3) how appropriate is the use of the American Indian in conveying the message; and (4) how likely is the respondent to take further action as a result of viewing the advertisment. The rationale and methods for answering each question are discussed. (ERA citation 06:023260)

DOE/TIC-1022409 PC **A08**/MF **A01**
New England Energy Congress, Somerville, MA.
Strategy Papers Prepared by the Implementation Group of the New England Energy Congress.
Jul 80, 155p

Over the nine months prior to release of this report, a 55-member task force worked at developing strategies and program initiatives to implement the New England Energy Congress' Blueprint for Energy Action, released in June 1979. Prepared for the bi-partisan, six-state New England Congressional Caucus, the Blueprint was the result of a first in the national effort to formulate a regional energy plan. Comprised of representatives of eleven constituencies ranging from environmental organizations to industry to state and Federal agencies, the Implementation Group of the Energy Congress divided itself into five working committees: (1) Wood, Solid Waste and Peat, (2) Electric Issues, (3) Conservation, Solar and Low Income, (4) Oil, and (5) Natural Gas, Coal, and Synfuels. Each committee developed strategy papers and program initiatives, which were reviewed by the full Implementation Group, and are presented here. Although the formal deliberations of the Energy Congress are now complete, the goals developed by the group are just beginning to be fulfilled. Initiatives in both the public and private sectors have been put into motion to achieve Energy Congress objectives. A number of recently enacted Federal and state laws directly reflect the group's input. (ERA citation 06:022119)

GESP-836 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Space Div.
Pipeline Bottoming-Cycle Study Demonstration Program Plan. Task V. Topical Report.
24 Jul 79, 60p
Contract AC03-77CS51381

A study to determine the feasibility of bottoming cycles on natural gas pipelines, using the waste heat from the exhaust gas of the prime movers to provide the additional shaft power and conserve some of the gas used to provide the pumping power, is described. Subsequent phases on the pipeline study are identified and are presented in a formal program plan. Phase II covers the directed studies; Phase III covers the design and construction information; and Phase IV describes system startup, operation, and data acquisition and analysis. This report also shows the timing of the various phases of the program. The statement of work in Appendix A describes involvements necessary to make the demonstration of the bottoming cycle equipment possible at a demonstration site. The master schedule for the entire program is presented for the entire program in the main text and the detailed schedule charts, by each task, are presented in the Appendix B. Further, the total estimated cost breakdown for each phase of the program is presented by the task and by the category of the participants. The total cost for the entire program without regard to cost participation is estimated to be around $6.5 million and is planned to take 48 months for the completion. (ERA citation 06:023754)

LA-UR-81-813 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Model Simplification: A Case Study of End Use Demand Modeling in the Transportation Sector.
A. Ford. 1981, 5p CONF-810701-2
Contract W-7405-ENG-36
Computer simulation conference, Washington, DC, USA, 15 Jul 1981.

The design of a rather simple model of petroleum use by automobiles in the US economy is considered. The model must be simple to allow it to function within a larger end use demand model under construction for use within the FOSSIL2 modeling system. The simple model has been designed so that its behavior under reasonable conditions will resemble the behavior of a much more complex model of the nation's transportation system. The complex model is known as ENTRANS. The model simplification approach described requires a summary of the behavioral response of the more complex model in a form that is readily mimicked by the simple model. The band of uncertainty in the relationships used in the simple model are determined through sensitivity testing of the more complex model. Problems inherent in the model simplification process are discussed in the concluding portion of the paper. (ERA citation 06:022227)

N81-26555/5 PC **A04**/MF **A01**
Applied Concepts Corp., Reston, VA.
USAF Solar Thermal Applications Overview.
Final Report.
J. S. Hauger, and J. A. Simpson. 4 May 81, 60p
NASA-CR-164481, JPL-9950-546
Contract JPL-955887

Process heat applications were compared to solar thermal technologies. The generic process heat applications were analyzed for solar thermal technology utilization, using SERI's PROSYS/ECONOMAT model in an end use matching analysis and a separate analysis was made for solar ponds. Solar technologies appear attractive in a large number of applications. Low temperature applications at sites with high insolation and high fuel costs were found to be most attractive. No one solar thermal technology emerges as a clearly universal or preferred technology, however,, solar ponds offer a potential high payoff in a few, selected applications. It was shown that troughs and flat plate systems are cost effective in a large number of applications.

ORNL/CSD/TM-141 PC **E07**/MF **A01**
Oak Ridge National Lab., TN.
Operating Experience with LEAP from the Perspective of the Computing Applications Analyst.
W. E. Ford, III, J. E. Horwedel, J. W. McAdoo, R. G. Alsmiller, Jr., and B. C. Toney. May 81, 192p
Contract W-7405-ENG-26
Includes 2 sheets of 48x reduction microfiche.

The Long-Term Energy Analysis Program (LEAP), which was used for the energy price-quantity projections in the 1978 Annual Report to Congress (ARC '78) and used in an ORNL research program to develop and demonstrate a procedure for evaluating energy-economic modeling computer codes and the important results derived therefrom, is discussed. The LEAP system used in the ORNL research, the mechanics of executing LEAP, and the personnel skills required to execute the system are described. In addition, a LEAP sample problem, subroutine hierarchical flowcharts, and input tables for the ARC '78 energy-economic model are included. Results of a study to test the capability of the LEAP system used in the ORNL research to reproduce the ARC '78 results credited to LEAP are presented. (ERA citation 06:022099)

ORNL/TM-7199 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.

Regional Economic and Energy Consumption Implications of the NEP-2 Base Case Scenarios.
D. J. Bjornstad, D. P. Vogt, and D. N. Stuckwish.
May 81, 69p
Contract W-7405-ENG-26

An attempt is made to measure the impact of changes in the national economy on regions of the United States, translated onto a grid of 173 regions, into national employment and energy consumption impacts that result from different prices for imported crude oil. These projections extend to the year 1995. Once calculated, regional economic and energy conditions are examined tabularly and graphically to highlight above and below average inter-temporal change and world oil price-related change. Regions are also classified by initial socioeconomic characteristics to determine if particular types of regions receive systematically different impacts. Although much evidence of systematic change is present at the regional level, the relatively small changes occurring in the national economy do not lead to large regional impacts. This analysis found no disruptive or highly significant regional impacts occurring from the price change assumptions of the scenarios. (ERA citation 06:022121)

PATENT-4 230 095
Not available NTIS
Department of Energy, Washington, DC.
Ideal Light Concentrators with Reflector Gaps.
Patent,
R. Winston. Filed 26 May 78, patented 28 Oct 80, 6p PAT-APPL-909 864
Supersedes PAT-APPL-909 864-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A cylindrical or trough-like radiant energy concentration and collection device is provided. The device includes an energy absorber, a glazing enveloping the absorber and a reflective wall. The ideal contour of the reflective wall is determined with reference to a virtual absorber and not the actual absorber cross section. (ERA citation 06:023376)

PB81-216905 PC **A08**/MF **A01**
Toulouse-3 Univ. (France).
Energy Self-Sufficiency in Indian Villages, Model of Demand-Resource Balance Sheet, Mathematical Planning of Optimal Production Unit (Autonomie Energetique de Villages de l'Inde, Modelisation du Bilan Demande-Ressources, Planification Optimale d'Une Production Locale).
Doctoral thesis,
Christine Tourrand-Brosset. 24 Jun 80, 175p
ORDER-692
Text in French.

The shortage of water and of wood for fuel is examined. Two solutions are considered--centralized production and local production--for the problem of supplying energy to the village. Local potentials, in all sources of renewable energy, are inventoried. An assessment is drawn up, showing the potential for local energy self-sufficiency based on use of renewable sources of energy within the village. A model of energy development and consumption was constructed for self-sufficiency in food and energy; ecology, technology, economics and sociology are taken into account.

PB81-217150 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Feasibility Study of Applying the Techniques of Optimal Control to the Energy Model of the European Economic Community with the Aim of Analysing and Clarifying the Optimal Energy Policies within the Community. (Etude de Faisabilite de l'Application des Techniques de Controle Optimal au Modele Energetique de la Communaute Economique Europeenne afin d'Analyser et de Degager des Politiques Energetiques Optimales dans la Communaute).
Final rept.,
F. Thys-Clement. c1980, 62p EUR-6790-FR
Text in English and French.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The object of the study is the feasibility of applying optimal control techniques to the medium term energy model of the EEC.

PB81-217267 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Results and Analysis of the CEC Round-Robin Testing of Three Solar Collectors,
A. Derrick. c1980, 101p EUR-6815-2-EN
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Twenty European laboratories collaborated in an attempt to standardise methods for the testing of solar collectors in a European climate. The following details are presented for each of the three collectors: instantaneous efficiency, effective thermal capacity, overall heat loss coefficient, fluid pressure-drop measurements, and notes about the methods.

PB81-217283 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
European Solar Collector Testing Activities and Test Methods.
Final rept.,
A. Derrick. c1980, 62p EUR-6815-1-EN
Prepared in cooperation with University Coll., Cardiff (England).
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Twenty European laboratories collaborated in an attempt to standardise methods of testing the efficiency of solar collectors. A list of the participating laboratories is provided with brief details of the test facilities available at each centre. Recommendations were made regarding the use of units and symbols, collector mounting and location, instrumentation for solar collector testing, and test methods.

PB81-217309 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
The Linkage between the Modules of the National Medium-Term EC Energy Models for: Belgium/Luxembourg, Federal Republic of Germany, and The Netherlands,
H. Mischke, H. Puetzstueck, and K. H. Bienewitz.
c1980, 119p EUR-6776-EN
Prepared by Battelle-Inst. e.V., Frankfurt (Germany, F.R.).
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Because of the newly defined Energy Flow Optimization Model, version 12C (EFOM 12C), major changes concerning the determination of the so called 'demand vector' had to be made. The demand vector provides the energy demand or energy-intensive productions for the energy flow module. It is a result obtained with the macroeconomic, the input-output and the energy demand modules. Data on this demand vector are given for the Federal Republic of Germany and are available at Battelle-Institut e.V., Frankfurt am Main for Belgium/Luxembourg and the Netherlands; however, the input data are based on German technological data.

PB81-217911 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Economic Activity and Energy Demand - Link to Energy Flow Example: France (EC Energy Modelling, Level II, Phase I).
c1980, 113p EUR-6773-EN
Prepared in cooperation with Battelle-Inst. e.V., Frankfurt am Main Batelle (Germany, F.R.). Centre de Recherche de Geneeve.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Data on the output of eight industrial and five service sectors derived from the EXPLOR model, are related to activity indices of production to enable projections to 1985 to be made. The energy efficiency of each of these sectors, i.e. the ratio of consumption to output is presented in several tables based on EXPLOR projections to 1985. Graphs show the relative importance of the different forms of fossil and other energy sources to the sectors and the possibilities for substitution of fuels. The matrix for the transition from EXPLOR to EFOM (energy flow optimization model) is described as well as the resulting computer program EXFOM. Because projections of this transition matrix are dependent on data from an energy demand model, covering industrial and domestic uses, several such models are investigated.

PB81-872525 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Environmental and Economic Aspects of Geothermal Energy. January, 1975-July, 1981 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for Jan 75-Jul 81.
Jul 81, 131p

The economic and environmental aspects of electric power generation by means of geothermal energy are considered. The costs of drilling, heat transfer equipment, and material corrosion protection are discussed and compared with other alternative energy systems. (Contains 140 citations fully indexed and including a title list.)

PNL-3739 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Candidate Wind Turbine Generator Site Annual Data Summary for January 1980 Through December 1980.
W. F. Sandusky, and D. S. Renne. Apr 81, 126p
Contract AC06-76RL01830

Summarized hourly meteorological data for fourteen candidate and wind turbine generator sites are presented in this report. These data are collected for the Department of Energy for the purpose of evaluating the wind energy potential at these sites and are used to assist in selection of potential sites for installation and testing of large wind turbines in electric utility systems. For each site, data are given in eight tables and one figure. Use of information from these tables, with information about specific wind turbines, should allow the user to estimate the potential for wind energy production at each site. (ERA citation 06:021985)

SAND-80-2669 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Guy-Cable Design and Damping for Vertical-Axis Wind Turbines.
T. G. Carne. May 81, 35p
Contract AC04-76DP00789

Guy cables are frequently used to support vertical axis wind turbines since guying the turbine reduces some of the structural requirements on the tower. The guys must be designed to provide both the required strength and the required stiffness at the top of the turbine. The axial load which the guys apply to the tower, bearings, and foundations is an undesirable consequence of using guys to support the turbine. Limiting the axial load so that it does not significantly affect the cost of the turbine is an important objective of the cable design. The lateral vibration of the cables is another feature of the cable design which needs to be considered. These aspects of the cable design are discussed in this paper, and a technique for damping cable vibrations is mathematically analyzed and demonstrated with experimental data. (ERA citation 06:021986)

SAND-81-1108C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Recent Darrieus Vertical-Axis Wind Turbine Aerodynamical Experiments at Sandia National Laboratories.
P. C. Klimas. 1981, 8p CONF-810226-5

Contract AC04-76DP00789
DOE/NASA wind turbine dynamics workshop, Cleveland, OH, USA, 24 Feb 1981.

Experiments contributing to the understanding of the aerodynamics of airfoils operating in the vertical axis wind turbine (VAWT) environment are described. These experiments are ultimately intended to reduce VAWT cost of energy and increase system reliability. They include chordwise pressure surveys, circumferential blade acceleration surveys, effects of blade camber, pitch and offset, blade blowing, and use of sections designed specifically for VAWT application. (ERA citation 06:021988)

UCRL-53140 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Energy Futures to Provide a Context for Energy R and D.
G. C. Werth, B. Rubin, R. A. Heckman, D. W. Dorn, and C. J. Anderson. 21 Apr 81, 55p
Contract W-7405-ENG-48

Constant evolution of this nation's views about energy poses many concerns for organizations carrying out energy R and D. Managers of such organizations need a context for assessing this evolution so they may judge the possible roles for research. Recognizing the need to develop strategic plans that are robust against all reasonable possibilities, we at the Lawrence Livermore National Laboratory have tackled the problem by examining the research implications of three radically different scenarios - low productivity and economic growth (the present trend), oil disruption (a distinct possibility), and an optimistic future in which the U.S. restores its economic strength and leadership. This work, done over the last year to provide a context for our management, is now made available to others. (ERA citation 06:021462)

10B. Power Sources

AD-A100 743/4 PC **A08**/MF **A01**
Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, FL.
On-Site Fuel Cell Energy Systems: The U.S. Air Force Field Test Demonstration Plan.
Final rept. 30 Mar-30 Sep 80,
Michael A. Aimone. Dec 80, 170p AFWAL-TR-80-2118
Contract F33615-77-C-2059
Prepared in cooperation with Wisconsin Univ., Madison. Dept. of Engineering and Applied Science.

The large scale application of fuel cell energy systems, electrochemical energy conversion devices, to facility operations, could result in significant benefits to the public and to the U.S. Air Force. This report summarizes the advantages and potential applications of fuel cells on an Air Force base, highlights the pertinent operational characteristics of a fuel cell, identifies the ongoing governmental and industrial programs that are aimed at commercializing this technology as early as the mid 1980's, and recommends and outlines a U.S. Air Force On-Site Fuel Cell Field Test Demonstration Program Plan.

AD-A100 785/5 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Computer Analysis of 400 HZ Aircraft Electrical Generator Test Data.
Master's thesis,
Philip Glen Gaberdiel. Jun 80, 167p Rept no. AFIT/GCS/EE/80-1
Availability: Microfiche copies only.

A software system was specified which would derive the performance measures of MIL-STD-704B from the test data provided by the Generator Test Facility. This analysis software system was then designed and implemented. Accuracy tests on the system demonstrated that very precise measurements of generator performance can be obtained. A software system was also designed and implemented to display the analysis results to the user. The display system employs a Tektronix 4010 terminal in an interactive mode to present the data. The user, therefore, selects the particular display and time range to be presented. (Author)

AD-A100 813/5 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Effect of Rotor Geometry on the Harmonic Performance of Synchronous Generators.
Master's thesis,
Cecil Stuerke, and David W. Nordquist. Dec 80, 123p Rept no. AFIT/GE/EE/80D-34

The use of rotor geometry as a specification in the control of generator voltage and flux density harmonics is studied. The possibility of generating a specific voltage waveform at the load with only a three-phase rectifier between the AC generator and the load is investigated. The armature reaction MMF is expressed as an infinite set of traveling waves with an infinite set of velocities. It is shown that the rotor MMF cannot cancel armature reaction everywhere because the rotor MMF has only the velocity of the rotor. The MMFs present at all the stator slots of an armature coil group are reflected into a single slot in an attempt to control the air gap flux density harmonics be selectively positioning increments of rotor reluctance. This method fails because a general solution for the reflected flux densities could not be obtained. Specifying the air gap reluctance incrementally as the rotor moves under successive stator slots is also tried as a means of harmonic control. This method proves unworkable due to negative MMF requirements and conflicting geometry specifications. Finite Element analysis is introduced as a computer aid to the design of a magnetic structure. Recommendations for further study are included. (Author)

AD-A100 827/5 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Prime Power to Pulse Conditioning Interface Methods.
Master's thesis,
Jaime Roberto Silva. Dec 80, 77p Rept no. AFIT/GE/EE/80D-39

AC and DC resonant charging hardware tests were conducted with a 15KW DOD standard 400 HZ generator as prime power. DC resonant charging caused vibrations of the generator at the pulsing frequency and instability of the voltage regulator due to the very irregular generator voltage waveform. The input DC voltage to the pulser sagged causing the performance to be lower than expected. An analysis of this problem and the theory to account for this sag is presented. Problems with the triggering of AC resonant charging were not solved in time for this report. The experimental set up of AC resonant charging is presented. AC resonant charging caused no negative impact on the generator which is a great advantage over DC resonant charging. (Author)

AD-A101 030/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Efficient Si Solar Cells by Laser Photochemical Doping.
Journal article,
Thomas F. Deutsch, George W. Turner, Daniel J. Ehrlich, John C. C. Fan, and Ralph L. Chapman. 25 Aug 80, 4p JA-5163, ESD-TR-81-71
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v38 n3 p144-146, 1 Feb 81.

No abstract available.

ANL/MHD-80-8 PC **A03**/MF **A01**
Argonne National Lab., IL.
MHD Heat and Seed Recovery Technology Project. Ninth Quarterly Report, January-March 1980.
M. Petrick, and T. R. Johnson. May 80, 34p
Contract W-31-109-ENG-38

The MHD Heat and Seed Recovery Technology Project at Argonne National Laboratory is obtaining information for the design and operation of the steam plant downstream of the MHD channel-diffuser, and of the seed regeneration process. The project goal is to supply the engineering data required in the design of components for prototype and demonstration MHD facilities. The primary effort of the HSR Technology Project at Argonne is directed toward experimental investigations of critical problem areas, such as (1) NO/sub x/ behavior in the radiant boiler and secondary combustor; (2) radiant boiler design to meet the multiple requirements of steam generation, NO/sub x/ decomposition, and seed-slag separation; (3) effects of solid or liquid seed deposits on heat transfer and gas flow in the steam and air heaters; (4) formation, growth, and deposition of seed-slag particles; and (5) character of the combustion gas effluents. These investigations are performed primarily in a 2-MW test facility, Argonne MHD Process Engineering Laboratory (AMPEL). Other project activities are related to studies of the thermochemistry of the seed-slag combustion gas system, identification of ceramic and metallic materials for service in the MHD-steam plant, and evaluation of seed regeneration processes. Progress is described. (ERA citation 06:022142)

CONF-800617-10 PC **A02**/MF **A01**
Argonne National Lab., IL.
Heat-Transfer Scaling Laws for MHD Channels and Diffusers.
R. K. Ahluwalia, and K. H. Im. 1980, 9p
Contract W-31-109-ENG-38
International conference on MHD electrical power generation, Cambridge, MA, USA, 16 Jun 1980.

A quasi-three-dimensional flow model is used to study the convective and radiative heat transfer characteristics of coal-fired MHD channels and diffusers. The radiative contributions of carbon dioxide, water vapor, potassium atoms, and slag particles are all included in the model. The scale-up of heat transfer with the size of MHD channels and diffusers is characterized as an aid to extrapolation of experimental heat transfer measurements. The scale-up of radiation with the channel or diffuser size, centerline temperature, wall temperature, boundary layer thickness, gas pressure, and average size and number density of slag particles is investigated. Generalized plots of gas emissivity and absorptivity are provided for use in estimating radiative heat transfer in MHD channels and diffusers. (ERA citation 06:023676)

CONF-810477-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Simulation of a Hydraulic Air Ingestion Process.
F. C. Chen, and A. Golshani. 1981, 9p
Contract W-7405-ENG-26
12. modeling and simulation conference, Pittsburgh, PA, USA, 30 Apr 1981.

A hydraulic air ingestion process which requires no mechanical moving parts to accomplish air compression but a downward flow of water and operates at nearly isothermal compression mode can be a viable alternative for the noncondensibles disposal of an OTEC open-cycle power system. A computer simulation of the process is presented based on one-dimensional lumped parameter analysis. Results of laboratory-scale experiments were obtained which compared favorably with the analytical results. A sensitivity study which depicts the effects of various parameters upon the applied head of the hydraulic air ingestion process is also presented. (ERA citation 06:023343)

CONF-810526-28(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Pulsed-Laser Annealing of Ion-Implanted Semiconducting GaAs for Homojunction Solar Cells.
D. H. Lowndes, J. W. Cleland, J. Fletcher, J. Narayan, and R. D. Westbrook. May 81, 8p
Contract W-7405-ENG-26
15. IEEE PV specialists conference, Orlando, FL, USA, 11 May 1981.

The results of a study whose purpose was to evaluate the combination of ion implantation followed by pulsed ruby laser annealing (11/PLA), as semiconducting GaAs substrates, are reported. High dose Zn, Mg, Si, and Se implants were used. PLA was carried out in air without encapsulation, and with thin sputtered SiO sub 2 encapsulation layers. The combination of I-V, C-V, scanning elec-

tron microscopy, transmission electron microscopy, and secondary ion mass spectroscopy measurements that were carried out have important implications for photovoltaic applications including the possibility of forming planar junctions, the choice of implanted ions to obtain high electrical activation, the optimum pulsed laser energy density range, the resultant junction depth and electrical characteristics, and the presence of laser-and implantation-induced residual defects. (ERA citation 06:021760)

CONF-810574-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Vacuum Deaeration for Ocean Thermal-Energy-Conversion Open-Cycle Applications.
A. Golshani, and F. C. Chen. 1981, 21p
Contract W-7405-ENG-26
International Association of Science and Technology for Development energy symposium, San Francisco, CA, USA, 20 May 1981.

Seawater deaeration is a process affecting almost all proposed Ocean Thermal Energy Conversion (OTEC) open-cycle power systems. If the noncondensable dissolved air is not removed from a power system, it will accumulate in the condenser, reduce the effectiveness of condensation, and result in deterioration of system performance. A gas desorption study was initiated at Oak Ridge National Laboratory (ORNL) with the goal of mitigating these effects; this study is designed to investigate the vacuum deaeration process for low-temperature OTEC conditions where conventional steam stripping deaeration may not be applicable. Studies were carried out on two areas: (1) vacuum deaeration in a packed column; and (2) deaeration in the barometric leg of the intake system. The design of a gas desorption test loop and a barometric intake system are described, the results of vacuum deaeration in a packed column and a barometric intake system are presented, and the saving that can be achieved when the packed column is combined with the barometric system is discussed. Vacuum deaeration laboratory experiments of three different kinds of packing in a packed column test section and a series of barometric intake deaeration experiments have been performed. A conceptual OTEC deaeration subsystem design based on these results and its implications upon an OTEC open cycle power system are presented. (ERA citation 06:023344)

DOE/CH/00135-3 PC **A13**/MF **A01**
Naval Coastal Systems Center, Panama City, FL.
Test Results of Heat-Exchanger Cleaning in Support of Ocean Thermal Energy Conversion.
D. F. Lott. Dec 80, 283p NCSC-TM-298-80
Contract AI02-79CH00135

These tests evaluated flow-driven brushes, recirculating sponge rubber balls, chlorination, and mechanical system/chlorination combinations for in-situ cleaning of two potential heat exchanger materials: titanium and aluminum alloy 5052. Tests were successful when fouling resistance was $<3.0 \times 10$ exp -4 ft exp 2 hr- exp 0 F/Btu. Results indicated systems and cleaning techniques using brushes, soft sponge balls, and various concentrations of chlorine had some potential for maintaining heat transfer efficiency. (ERA citation 06:021841)

DOE/ER/10160-T3 PC **A02**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
SPS Susceptible-System Cost Factors Investment Summary and Mitigation-Cost-Increment Estimates.
E. L. Morrison. May 80, 13p
Contract AI01-80ER10160

The Electromagnetic Compatibility (EMC) evaluation program supporting the SPS Concept Development Evaluation Phase has included examinations of the degradation in capability of all susceptible communications and electronic systems that could be exposed to SPS emissions, the development and testing of mitigation techniques to allow operation in the SPS environment, and the development of total investment and mitigation cost data. Mitigation costs relate only to the modification or reconfiguration of susceptible systems; redeployment being a possible consideration for rectenna siting exercises during the SPS Engineering Development Phase. An extensive survey is summarized regarding the current and planned facilities using the equipment categories listed: microwave communications; radar systems; sensors; computers; medical equipment; and research support. Current investment, future plans, and mitigation costs are presented, with geographic distribution in six CONUS areas. (ERA citation 06:021751)

DOE/ET/10340-T3 PC **A11**/MF **A01**
General Electric Co., Schenectady, NY. Gas Turbine Products Div.
High-Temperature Turbine Technology Program. Turbine Subsystem Design Report: Low-Btu Gas.
M. W. Horner. Dec 80, 227p
Contract AC01-76ET10340

The objective of the US Department of Energy High-Temperature Turbine Technology (DOE-HTTT) program is to bring to technology readiness a high-temperature (2600 exp 0 F to 3000 exp 0 F firing temperature) turbine within a 6- to 10-year duration, Phase II has addressed the performance of component design and technology testing in critical areas to confirm the design concepts identified in the earlier Phase I program. Based on the testing and support studies completed under Phase II, this report describes the updated turbine subsystem design for a coal-derived gas fuel (low-Btu gas) operation at 2600 exp 0 F turbine firing temperature. A commercial IGCC plant configuration would contain four gas turbines. These gas turbines utilize an existing axial flow compressor from the GE product line MS6001 machine. A complete description of the Primary Reference Design-Overall Plant Design Description has been developed and has been documented. Trends in overall plant performance improvement at higher pressure ratio and higher firing temperature are shown. It should be noted that the effect of pressure ratio on efficiency is significally enhanced at higher firing temperatures. It is shown that any improvement in overall plant thermal efficiency reflects about the same level of gain in Cost of Electricity (COE). The IGCC concepts are shown to be competitive in both performance and cost at current and near-term gas turbine firing temperatures of 1985 exp 0 F to 2100 exp 0 F. The savings that can be accumulated over a thirty-year plant life for a water-cooled gas turbine in an IGCC plant as compared to a state-of-the-art coal-fired steam plant are estimated. A total of $500 million over the life of a 1000 MW plant is projected. Also, this IGCC power plant has significant environmental advantages over equivalent coal-fired steam power plants. (ERA citation 06:021994)

DOE/ET/10340-T4 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Gas Turbine Products Div.
Development of High-Temperature Turbine Subsystem Technology to a Technology Readiness Status, Phase II. Quarterly Report, January-March 1981.
M. W. Horner. Apr 81, 80p FE-1806-107
Contract AC01-76ET10340

progress in developing a technical readiness vehicle (TRV) for demonstrating the performance of a combined-cycle power plant with high-temperature, 2600 to 3000 exp 0 F firing temperature, gas turbines using coal-derived gas fuel is reported. Work on the combined-cycle power plant and TRV design, component development, aerodynamics studies, simulation, and fuel gas cleanup systems is described. (ERA citation 06:021995)

DOE/ET/10348-T2 PC **A08**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
High-Temperature-Turbine Technology Program. Phase II. Technology Test and Support Studies. Technical Progress Report, April 1, 1979-June 30, 1979.
Jul 79, 171p FE-2291-48A, CW-WR-76-02048A
Contract AC01-76ET10348

Work performed on the High-Temperature-Turbine Technology Program, Phase II-Technology Test and Support Studies during the period from 1 April 1979 through 30 June 1979 is summarized. Objectives of the program elements as well as technical progress and problems during this Phase II quarterly reporting period are presented. Planned progress during the next quarterly reporting period is also defined. Testing of the LP rig engine with hot gas stream particulates simulating operation on low Btu gas is described. Fabrication of components and preparation of facilities for future tests of the Turbine Spool Technology Rig are discussed together with analytical reviews. Preparation of the low Btu gas synthesizing facility is discussed. Supporting Materials and Process investigations are described. (ERA citation 06:021996)

DOE/ET/11293-T3 PC **A07**/MF **A01**
Rasor Associates, Inc., Sunnyvale, CA.
Advanced Thermionic Energy Conversion. Joint Highlights and Status Report, July-September 1979.
1979, 131p COO-2263-16
Contract AC02-76ET11293

The DOE portion of the effort is directed primarily toward terrestrial applications of thermionic energy converters suitable for use with fossil fueled heat sources in power plants. The NASA program is directed at establishing the technical feasibility of an advanced, light-weight, long-life thermionic conversion system compatible with a remote nuclear or solar heat source. The principal application foreseen at this time is in nuclear electric propulsion (NEP) missions in the mid-1990's. Significant accomplishments for the DOE program include: (1) successfully operating a thermionic converter using a cold insulator seal (Plexiglass and Viton); (2) completed fabrication and testing of SPC-9, a reference planar converter with smooth molybdenum electrodes; (3) created a shooting type analytical ignited mode converter computer model; (4) projected the operating conditions needed to achieve advanced converter performance with a thick cesium oxide collector; and (5) invented a cellular ceramic heat exchanger for obtaining high radiant heat flux from a hot gas. Accomplishments for the NASA program include: (1) achieved over 3100 hours of operation with the cylindrical converter JPL-5 (STR/STR); (2) provided guidelines for definition of optimum lead characteristics in the JPL NEP computer program; and (3) performed a preliminary NEP optimization study which suggests a 400 kWe system with a specific mass of 26 kg/kWe is possible with present converter performance (V/sub B/ = 2.0). Details are presented. (ERA citation 06:022154)

DOE/ET/11304-T10 PC **A06**/MF **A01**
Energy Research Corp., Danbury, CT.
High-Temperature Molten-Carbonate Fuel Cells. Technical Progress Report, January-March 1979.
May 79, 110p
Contract AC02-76ET11304

Progress on the design, development, fabrication, performance testing, and modeling of molten carbonate fuel cells is reported. Component development including electrode structures, electrolyte powder, electrolyte tiles, and cell frame and current collectors is described. (ERA citation 06:022158)

DOE/ET/15346-T1 PC **A10**/MF **A01**
InterTechnology/Solar Corp., Warrenton, VA.
Research and Development of the Osmo-Hydro Power Heat Engine. Final Report.
25 Nov 80, 211p
Contract AC05-78ET15346

The Osmo-Hydro Power (OHP) or Pressure-Retarded Osmosis (PRO) heat engine is a possible means for producing economical electric power from low-temperature heat sources. The engine utilizes semipermeable membranes to cause the permeation of a solvent from a dilute low-pressure solution to a concentrated high-pressure solution. The potential energy thus acquired is converted to useful energy by means of a turbogenerator. The process can be considered as one in which the free energy of mixing is converted to useful power. By appropriate application of a heat source and a heat sink, the original dilute and concentrated solutions are recovered, thus completing the heat engine cycle. The results of this initial project to study osmotic power generation from waste heat indicate what research paths must be followed to continue the development of distillation and conju-

gation as unmixing methods. In addition, precipitation and stratification have been shown to be desirable because of the possibility of readily matching a binary system with either a membrane presently available or one readily modified from an existing membrane. The OHP heat engine in its ultimate development would have the following general characteristics: it would be able to utilize low-grade heat sources, such as unconcentrated solar energy or waste heat below 100 exp 0 C., heat sources as low as 50 exp 0 C can be used; the engine should be able to produce electricity for 0.12 $/kWh, or less, but the thermal efficiency will be less than 25% of Carnot efficiency at the same temperature limits; and the engine would be modular; i.e., it could be scaled up or down largely by adding or subtracting discrete permeator and heat exchanger units. (ERA citation 06:023416)

DOE/ET/15602-T4 PC **A10**/MF **A01**
FluiDyne Engineering Corp., Minneapolis, MN.
MHD Air Heater Technology Development. Annual Technical Progress Report, January 1, 1980-December 31, 1980.
Mar 81, 204p
Contract AC01-80ET15602

Progress on the technology development of the directly-fired high temperature air heater (HTAH) for MHD power plants is described in detail. The objective of task 1 is to continue development of ceramic materials technology for the directly-fired HTAH. The objectives of task 2 are to demonstrate the technical feasibility of operating a directly-fired HTAH (including both the heater matrix and valves), to continue obtaining information on life and corrosion resistance of HTAH materials, and to obtain design information for full-scale studies and future design work. The objectives of task 3 are to begin the identification of HTAH control requirements and control system needs, and to continue full-scale study efforts incorporating updated materials and design information in order to identify development needs for the HTAH development program. (ERA citation 06:022149)

DOE/ET/17091-T1 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Electrocyclone Development Program. Quarterly Technical Report, November 1980-January 1981.
1981, 38p FE-7091-6
Contract AC21-80ET17091

Progress is reported in research on the use of applied electrostatics to enhance the performance of large cyclone collectors for cleaning hot exhaust gases from pressurized fluidized bed combustors in coal-fired power plants. The electrocyclone design parameters, electrode configuration tests, and electrostatic component development are discussed. (ERA citation 06:022000)

DOE/ET/20279-128 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Loss of Line Shutdown for Line-Commutated Utility-Interactive Inverter.
E. E. Landsman. Mar 81, 10p
Contract AC02-76ET20279

The line-commutated, single-phase, utility-interactive inverter has been used in utility-connected photovoltaic (PV) and wind energy systems because it is commercially available at an attractive price. If unity power factor operation is required, a shunt capacitor can be used. This causes a problem if the utility line is disconnected; the inverter can continue to run and can thus be a hazard. This can be solved by using a fast-acting overvoltage detection circuit which operates directly on the inverter control electronics. (ERA citation 06:021815)

DOE/ET/20279-96 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Residential Photovoltaic Systems Costs.
C. H. Cox, III. 1980, 8p CONF-800806-17
Contract AC02-76ET20279
15. intersociety energy conversion engineering conference, Seattle, WA, USA, 18 Aug 1980.

A study of costs associated with the installation and operation of a residential photovoltaic system has been conducted to determine present and projected (1986) status. As a basis for the study, a residential photovoltaic system design projected for 1986 was assumed, consisting of two principal components: a roof-mounted array and a utility-interactive inverter. The scope of the study encompassed both silicon and cadmium sulfide photovoltaic modules. Cost estimates were obtained by a survey and study of reports generated by companies and agencies presently active in each of the subsystem area. Where necessary, supplemental estimates were established as part of this study. The range of estimates for silicon-based systems strongly suggest that such systems will be competitive for new installations and reasonably competitive for retrofit applications. The cadmium-sulfide-based system cost estimates, which are less certain than those for silicon, indicate that these systems will be marginally competitive with silicon-based systems for new construction, but not competitive for retrofit applications. Significant variations from the DOE system price sub-goals were found, however, particularly in the areas of array mounting, wiring and cleaning. Additional development work appears needed in these areas. (ERA citation 05:027122)

DOE/ET/21007-T1 PC **A03**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
10-MW/sub E/ Collector Subsystem Software/ Firmware Functional Requirements Specification. Report MCR-79-1310.
P. S. Thames. 6 Feb 79, 40p
Contract AC03-79ET21007

The functional requirements for the software system are provided, and the basis for development of software/firmware testing during the System Level Test is given. The software for the 10 MWe Solar Thermal Power Piant Collector Subsystem (Phase I) shall have the capability to allow operator control of two heliostats for purposes of testing. This function includes the capability of operator commanded mode control, status display, and alarm generation. (ERA citation 06:023318)

DOE/IR/05106-T24 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Local Government Guide to the Emerging Technologies of Cogeneration and Photovoltaics. Energy Technology Report of the Energy Task Force of the Urban Consortium.
1980, 44p
Contract FG02-78IR05106

An overview of cogeneration and photovoltaics systems is presented to provide local government managers a basic understanding of the technologies. Issues and considerations associated with applications are presented. Discussions cover installation and maintenance requirements, equipment availability, costs, and risks/benefits. Data describing demonstration sites and contacts for further information are provided. (ERA citation 06:021821)

DOE/JPL/954527-81/18 PC **A03**/MF **A01**
Springborn Labs., Inc., Enfield, CT.
Investigation of Test Methods, Material Properties, and Processes for Solar-Cell Encapsulants. Nineteenth Quarterly Progress Report, November 12, 1980-February 12, 1981.
P. B. Willis, B. Baun, and A. Goulet. 1981, 29p
Contract NAS-7-100-954527

Formulation of the butyl acrylate syrup/casting pottant was completed and is now ready for the first stage of industrial evaluation. The formulation contains an ultraviolet stabilizer system and may be cured with an initiator that, unlike former selections, presents no shipping or handling hazards to the user. The catalyzed syrup is stable at room temperature and has a pot life of at least eight hours. The syrup cures to a transparent rubber in 18 minutes at a temperature of 60 exp 0 C. The formulation of the ethylene/methyl acrylate lamination pottant was also completed. This compound is the alternative pottant to ethylene/vinyl acetate (EVA) and is similarly produced as an extruded sheet that is wound into rolls. Experiments were conducted to select the most appropriate base resin for this compound and generate a first-cut formulation suitable for industrial evaluation purposes. The large scale extrusion conditions were determined and a 250 pound quantity was produced as a film of 30 inch width and 0.02 inch gauge. This resin is inherently non-blocking; consequently no release paper was used to separate the plies. Experimental modules were prepared to verify performance and the cure profile was determined at a variety of times and temperatures. Due to the current commercial interest in the EVA lamination pottant some revised studies were conducted with respect to the time/temperature cure requirements for successful use of this compound. The times needed to produce successful gel contents were redetermined at a variety of temperatures and these results were related to the peroxide half-life temperature curve. (ERA citation 06:023274)

DOE/JPL/954796-81/12 PC **A09**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA.
Analysis and Evaluation in the Production Process and Equipment Area of the Low-Cost Solar-Array Project. Quarterly Report, July-October, 1980.
M. Wolf, and H. Goldman. Jan 81, 176p
Contract NAS-7-100-954796

The attributes of the various metallization processes have been investigated which express themselves in economic results. It has been shown that several metallization process sequences will lead to adequate metallization for large area, high performance solar cells at a metallization add-on price in the range of $6.- to 12.-/m exp 2 , or 4 to 8 cents/W(peak), assuming 15% efficiency. Conduction layer formation by thick film silver or by tin or tin/lead solder leads to metallization add-on prices significantly above the $6.- to 12.-/m exp 2 range. The wet chemical processes of electroless and electrolytic plating for strike/barrier layer and conduction layer formation, respectively, seem to be most cost-effective. Vacuum deposition of the strike/barrier layer can be competitive with electroless plating. (ERA citation 06:021767)

DOE/JPL/955089-80/10 PC **A04**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Silicon Solar Cell Process Development, Fabrication, and Analysis. Eighth Quarterly Report, 1 October 1980-31 December 1980.
H. I. Yoo, P. A. Iles, and D. C. Leung. 1980, 55p
Contract NAS-7-100-955089

Work included fabrication and characterization of solar cells from heat exchanger method (HEM), Dendritic Webs, and edge defined film-fed growth (EFG) ribbons. HEM solar cells showed only slight enhancement in cell performance after gettering steps (diffusion glass) were added. Dendritic webs from various growth runs indicated that performance of solar cells made from the webs was not as good as that of the conventional Czochralski (CZ) cells. EFG ribbons grown in CO ambient showed significant improvement in silicon quality. Efforts to passivate grain boundaries (G.B.) by preferential diffusion through G.B. did not result in improvement of sheet quality. Silicon sheets in these tests included SILSO, EFG, and Poly CZ. (ERA citation 06:021768)

DOE/JPL/955456-1(V.5) PC **A03**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Monitoring and Control Requirement Definition Study for Dispersed Storage and Generation (DSG). Volume V. Final Report, Appendix D: Cost-Benefit Considerations for Providing Dispersed Storage and Generation for Electric Utilities.
Oct 80, 40p
Contract AI01-79ET29372

A major aim of the US National Energy Policy, as well as that of the New York State Energy Research and Development Authority, is to conserve energy and to shift from oil to more abundant domestic fuels and renewable energy sources. Dispersed Storage and Generation (DSG) is the term that characterizes the present and future dis-

persed, relatively small (<30 MW) energy systems, such as solar thermal electric, photovoltaic, wind, fuel cell, storage battery, hydro, and cogeneration, which can help achieve these national energy goals and can be dispersed throughout the distribution portion of an electric utility system. Cost benefit considerations are extremely important in obtaining the acceptance of dispersed storage and generation by the electric utilities. These considerations may involve somewhat different economic analyses depending on whether the generation is utility, customer, or combined ownership. It will be necessary to get acceptance of more easily understood methods for evaluating the economics of DSG because much of the benefits of DSG may accrue in the generation and transmission portions of the utility system while the costs tend to be centered in the distribution portion of that system. Depending on the rating and availability of the DSG, the monitoring and control portion of the system may be relatively low in cost compared to the value of the energy supplied for DSGs in the 5 MW range and above and relatively high in cost compared to the smaller 10 to 50 kW units. The influence of other factors, such as reliability, capital costs, and other economic measures, can be important to utility and customer alike in judging the costs and benefits of DSGs. (ERA citation 06:022132)

DOE/JPL/955567-81/3 PC **A02**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
Design, Analysis, and Test Verification of Advanced Encapsulation System. Triannual Report for Period Ending 31 March 1981.
A. Garcia, and C. Minning. May 81, 22p
Contract NAS-7-100-955567

Procurement of 4" x 4" polycrystalline solar cells has proceeded with some delays. A total of 1200 cells have been procured for use in both the verification testing and qualification testing. Additional thermal structural analyses have been run and the data are presented. An outline of the verification testing is included with information on test specimen construction. (ERA citation 06:023276)

DOE/JPL/955640-81/5 PC **A03**/MF **A01**
Spire Corp., Bedford, MA.
Development and Fabrication of a Solar-Cell-Junction Processing System. Quarterly Progress Report No. 5.
R. Kiesling. Apr 81, 34p
Contract NAS-7-100-955640

Fabrication of the first stage of the pulsed electron beam annealer was completed. The objective of these initial checks was to test the functioning of its separate subsystems. Appropriate modifications based upon measurements taken are planned for the next quarter. Annealing of four inch wafers at the required rate must await completion of the wafer transport development and fabrication. There were four groups of tests, those of the mechanical and electrical subsystems, pulse generator, electron beam diode and the annealing process. Annealing experiments were begun at the end of March and will continue after modification of the pulser to insure reproducibility and uniformity. Electrical characterization of diode behavior as a function of varying paramerers is far advanced. Initial tests of subsystems and the pulse generator are complete using the 160 kV test power supply and the first production run of dielectric liners. The complete engineering system design has been formulated, and the accompanying manufacturing detail drawings are about 60 percent complete. The entrance and exit Y tracks of the processing chamber have been designed to interconnect with the 50 carrier cassette elevator locks by means of short three-phase transition track sections located between the outside vacuum locks and the processing chamber. (ERA citation 06:023277)

DOE/NASA/0067-79-6 PC **A04**/MF **A01**
Energy Research Corp., Danbury, CT.
Technology Development for Phosphoric Acid Fuel Cell Powerplant (Phase II): 7TH Quarterly Report.
L. Christner. Jun 80, 52p
Contract AC01-78ET13114

Technology development of materials, cell components, and reformers for on-site integrated energy systems is described in this quarterly report. Significant progress includes: (1) improvements in internal resistance and contact resistance have been achieved; (2) dissolved gases (O sub 2 , N sub 2 , and CO sub 2) have no effect on the electrochemical corrosion of phenolic composites; and (3) stack performance has been increased by 100 mV over the average 1979 level. (ERA citation 06:022162)

DOE/NASA/0139-1 PC **A18**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
Disk MHD Generator Study.
F. D. Retallick. Oct 80, 422p NASA-CR-159872, AESD-TME-3064
Contract AI01-77ET10769

A parametric study of coal-fired MHD/steam power plants with disk-shaped MHD generators was performed, in order to investigate the potential of such systems. Both open-cycle and closed-cycle MHD power trains were investigated. For the open-cycle disk power plants, system configurations of three basic types were evaluated: one type with directly-fired high temperature regenerative air heaters; a second type with separate gasifier-fired high temperature regenerative air heaters; and a third type without a regenerative air heater but with oxygen enrichment of the MHD combustor oxidant. The closed-cycle disk power plant systems analyses investigated the performance of argon-driven disk generator systems with direct coal combustor firing of the argon regenerators. Open-cycle disk generator performance calculated in the study were found to lie in the range of performances reported by similar studies of linear MHD systems. The calculated performances of the closed-cycle disk generator systems were also found to be comparable to the calculated performances for similarly-sized linear generator systems. Costs for disk-related components were determined to be from one-half to three-quarters of the major component costs for linear MHD power systems. Closed-cycle disk component costs were also shown to have the potential for being significantly lower than those of comparable linear MHD systems. (ERA citation 06:020361)

DOE/NASA/10769-15 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Preliminary Investigation of Acoustic Oscillations in an H sub 2 -O sub 2 Fired Hall Generator.
B. Phillips. 1981, 12p CONF-810639-4, NASA-TM-81756
Contract AI01-77ET10769
19. symposium on the engineering aspects of magnetohydrodynamics, Tullahoma, TN, USA, 15 Jun 1981.

Burner pressure oscillations and interelectrode voltage oscillations measured in an open-cycle supersonic flow Hall generator are presented. The ionized gas for the channel was supplied by seeding the approximately 1 lb/sec of hydrogen-oxygen combustion products with cesium. Since both the burner and the channel were located within magnetic fields exceeding 4 Tesla during operation, an infinite probe pressure measurement technique was used to measure burner pressure oscillations. Calibration of the burner pressure transducer using a resonance tube technique is presented. Evidence is presented for the existence of the first longitudinal mode of oscillations (5000 Hz) within the burner. Interelectrode voltage oscillations were simultaneously measured at two seperate axial stations. The magnitude change and the phase shift between the two signals was interpreted as a decaying magnetoacoustic wave driven by the burner that propagates at local gas plus sonic velocities. The amplitude of the electrical voltage oscillations at the start of the power producing region of the channel varied with the magnetic field. This variation is compared with the results of a simple perturbation analysis. Arguments are presented for using an unsteady model for analyzing wave processes in channels. (ERA citation 06:023689)

DOE/NASA/10769-16 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Performance Calculations for 200-1000 MWe MHD/Steam Power Plants.
P. J. Staiger. 1981, 11p NASA-TM-81775, CONF-810639-1
Contract AI01-77ET10769
19. symposium on the engineering aspects of magnetohydrodynamics, Tullahoma, TN, USA, 15 Jun 1981.

The effects of MHD generator length, level of oxygen enrichment, and oxygen production power on the performance of MHD/steam power plants ranging from 200 to 1000 MW in electrical output are investigated. The plants considered use oxygen enriched combustion air preheated to 1100 exp 0 F. Both plants in which the MHD generator is cooled with low temperature and pressure boiler feedwater and plants in which the generator is cooled with high temperature and pressure boiler feedwater are considered. It is shown that for plants using low temperature boiler feedwater for generator cooling the maximum thermodynamic efficiency is obtained with shorter generator and a lower level of oxygen enrichment compared to plants using high temperature boiler feedwater for generator cooling. It is also shown that the generator length at which the maximum plant efficiency occurs increases with power plant size for plants with a generator cooled by low temperature feedwater. Also shown is the relationship of the magnet stored energy requirement to the generator length and the power plant performance. Possible cost/performance tradeoffs between magnet cost and plant performance are indicated. (ERA citation 06:022151)

DOE/NASA/10769-17 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Assessment of Disk MHD Generator for a Base-Load Powerplant.
D. L. Chubb, F. D. Retallick, C. L. Lu, M. Stella, and J. D. Teare. 1981, 15p CONF-810639-2
Contract AI01-77ET10769
19. symposium on the engineering aspects of magnetohydrodynamics, Tullahoma, TN, USA, 15 Jun 1981.

A summary of the results from a recent Westinghouse-MIT systems study of the disk MHD generator are presented. Both open and closed-cycle disk systems were investigated in the Westinghouse-MIT study. Costing of the open-cycle disk components (nozzle, channel, diffuser, radiant boiler, magnet and power management) was done. However, no detailed costing was done for the closed-cycle systems. Preliminary plant design for the open-cycle systems was also completed. Based on the system study results, an economic assessment of the open-cycle systems is presented. The following open-cycle plant efficiencies, eta/sub t/, were calculated. For a directly fired preheat system with 1920 exp 0 K (2006 exp 0 F) preheat temperature eta/sub t/ = 45.5%, for a directly fired system with 1650 exp 0 K (2500 exp 0 F) preheat temperature eta/sub t/ = 43.4%, for a separately fired preheat system at 1920 exp 0 K (2006 exp 0 F) eta/sub t/ = 39% and for an oxygen-enriched system with low temperature recuperative preheat eta/sub t/ = 40.5%. Costs of the open-cycle disk components are less than comparable linear generator components. Also, costs of electricity for the open-cycle disk systems are competitive with comparable linear systems. Advantages of the disk design simplicity are considered. Improvements in the channel availability or a reduction in the channel lifetime requirement are possible as a result of the disk design. (ERA citation 06:023690)

DOE/NASA/10769-18 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Conceptual Design of the MHD Engineering Test Facility.
D. J. Bents, R. W. Bercaw, and J. A. Burkhart. 1981, 10p CONF-810639-3
Contract AI01-77ET10769
19. symposium on the engineering aspects of magnetohydrodynamics, Tullahoma, TN, USA, 15 Jun 1981.

The reference conceptual design is summarized of the MHD Engineering Test Facility (ETF), a proto-

type 200 MWe coal-fired electric generating plant designed to demonstrate the commercial feasibility of open cycle MHD. Main elements of the design are identified and explained, and the rationale behind them is reviewed. Major systems and plant facilities are listed and discussed. Construction cost and schedule estimates are presented, and the engineering issues that should be reexamined are identified. (ERA citation 06:023691)

DOE/SF/10499-T11 PC **A04**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Meteorological Station Requirements Specification (RADL Item 7-19).
Nov 79, 75p SAN-0499-26, MDC-G-8224
Contract AC03-79SF10499

The meteorological parameters are identified which affect plant operation and performance evaluation and support special collector field studies such as wind/heliostat structural and cloud/collector field interactions. The identification of the instruments required to measure those parameters and the instrument locations are included, and designs are suggested for integrating the hardware into the collector field. All meteorological related equipment up to the signal input to the Data Acquisition System (DAS) of the Master Control System (MCS) computer is included. Operational and survival environmental conditions, maintenance, and spares requirements are discussed. Manufacturer-supplied information on the major hardware of interest is compiled. (ERA citation 06:023322)

DOE/SF/10499-T12 PC **A03**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Technical Objectives Report - MCS (RADL Item 2-26).
Sep 79, 36p SAN-0499-14, MDC-G-7895
Contract AC03-79SF10499

The technical objectives define the operating capabilities to be built into the plant which the master control subsystem (MCS) must handle. These capabilities include assistance in plant startup, conditioning, shutdown, control in various operating modes, mode transitions, and a clear day scenario. Required control and display capability and equipment are described. Evaluation requirements and operational performance requirements are also stated. (ERA citation 06:023323)

DOE/SF/10499-T13 PC **A18**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Plant-Support Subsystem Procurement Documentation (RADL Item 7-44C).
Sep 80, 421p SAN-0499-74, MDC-G-8592
Contract AC03-79SF10499

Procurement documentation is presented for the long lead material required to be procured in support of the Piping and Mechanical Equipment Construction Package 9. The purchase specifications define the technical requirements for the specific long lead items to be procured. They represent the final specification as conformed for purchase. The hardware was grouped into three categories as follows: A. Primary Prefabricated Pipe (heavy wall and alloy), B. Primary Pipe Supports, and C. Pipe Support Snubbers. The detail technical specification for each of these procurement packages are included. The purchase orders issued for each of the procurement packages are included to provide a detailed listing of each procurement. A copy of the purchase order for each package is included. The need dates established for each of the various items of hardware is identified in the purchase specification and on the purchase orders. (ERA citation 06:023324)

DOE/SF/10499-T17 PC **A03**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Final Summary Soils Report (RADL 7-1).
Jun 79, 44p SAN-0499-7, MDC-G-7861
Contract AC03-79SF10499

Descriptions of the plant site, site grading, structural foundations, roads, geologic, seismic and soil conditions are given. Criteria for earthwork, foundation design, road, parking area and pavement design are given. Suggestions for specifications for the engineered fill are included. (ERA citation 06:023327)

DOE/SF/10499-T18 PC **A06**/MF **A01**
Foster Wheeler Development Corp., Livingston, NJ. John Blizard Research Center.
Independent Feasibility Assessment (RADL Item 4-4).
Jun 79, 125p SAN-0499-9, MDC-G-7864
Contract AC03-79SF10499

Reviews and analyses are presented of critical design areas to determine whether the proposed receiver has any serious design deficiencies or operating limitations that would require major modifications. Included are reports on review of heat transfer and pressure drop correlations used in receiver design, receiver panel static stability and receiver evaporator/superheater panel dynamic stability analysis. (ERA citation 06:023328)

DOE/SF/10499-T19 PC **A07**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Plant-Support Subsystem Procurement Documentation (RADL Item 7-44A).
Jul 80, 146p SAN-0499-60, MDC-G-8554
Contract AC03-79SF10499

Procurement for the long lead material required to be procured in support of the Collector Field Electrical Construction Package 11A is documented. The purchase specifications define the technical requirements for the specific long lead items to be procured. They represent the final specification as conformed for purchase. The hardware consists of heliostat interface load interrupter switchgear and interface control cabinets, 5000-volt and 600-volt power cables, coaxial cable, and heliostat power centers. The purchase orders for each of the procurement packages are included. The need dates established for each of the items of hardware is identified in the purchase specification and on the purchase orders. (ERA citation 06:023329)

DOE/SF/10499-T20 PC **A05**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Quality-Assurance Plan (RADL Item 1-2).
Jul 79, 78p SAN-0499-3, MDC-G-7836
Contract AC03-79SF10499

Quality assurance responsibilities of Solar Facilities Design Integration, Rocketdyne, Stearns-Roger, and McDonnell Douglas Astronautics Company are stated. Policies and procedures for management and planning, design and development, procurement, manufacturing, fabrication and assembly are spelled out for each contractor. (ERA citation 06:023330)

DOE/SF/10499-T21 PC **A03**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
System Safety Plan (RADL 2-24).
Jun 79, 37p SAN-0499-6, MDC-G-7855
Contract AC03-79SF10499

A program is presented for applying system safety engineering principles to develop a solar facilities portion of the 10-MWe Solar Thermal Central Receiver Pilot Plan that will be free of hazards to operating personnel, plant visitors, or the general public. The several specific hazard analyses and how they will be performed, the development of system safety criteria, participation by System Safety personnel in program and design reviews, provisions for subcontractor safety efforts, the interrelationships of the several Government and private organizations, including subcontractors, in the system safety effort, and the safety functions during the design, activation, startup, and operation of the pilot plant are described. (ERA citation 06:023331)

DOE/SF/10499-T22 PC **A07**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Preliminary Design Review - 50% Complete (RADL Item 1-5).
30 Jul 79, 144p SAN-0499-11, MDC-G-7881
Contract AC03-79SF10499

Design topics include system engineering and integration, and the receiver, collector, thermal storage, plant support, plant control, master control, and beam characterization subsystems. (ERA citation 06:023332)

DOE/SF/10499-T23 PC **A03**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Collector-Field Layout Specification (RADL Item 2-12).
Feb 80, 50p SAN-0499-18, MDC-G-8201
Contract AC03-79SF10499

Layout requirements and constraints are defined for all permanent foundations, facilities, and equipment located in the collector field. The equipment pads and environmental shelters are discussed because of their potential physical interaction with other elements of the collector field. (ERA citation 06:023333)

DOE/SF/10499-T24 PC **A02**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Plant Control Building Design Requirements Specification (RADL Item 7-26).
Apr 80, 16p SAN-0499-20, MDC-G-8203
Contract AC03-79SF10499

The room areas required for the upper level of the building are identified and described. Architectural/structural and electrical requirements are stated, as are requirements for the space HVAC system. (ERA citation 06:023334)

DOE/SF/10499-8-3 PC **A04**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Receiver Feedwater Pump and Drive Specification (RADL Item 7-38): 10-MWe Solar-Thermal; Central-Receiver Pilot Plant; Solar-Facilities Design Integration.
Aug 79, 69p SAN-0499-12, MDC-G-7889
Contract AC03-79SF10499

The specifications are given for the motor driven Receiver Feedwater Pumps, drive and accessories. Requirements and procedures for documentation are also included. Equipment bid data, variable speed drive data, and motor data sheets are included. (ERA citation 06:023319)

DOE/SF/10756-1 PC **A13**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Preliminary Heat Pipe Testing Program. Final Technical Report.
Mar 81, 282p
Contract AC03-79SF10756

The combined cycle solar power system studies are described. The heat pipe receiver analysis and its results are presented. The test plans and designs of the test stands and test articles are described. The test results and evaluation of these results are presented. (ERA citation 06:021838)

LBL-11324(Rev.) PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Accuracy of the Edgeworth Approximation for LOLP Calculations in Small Power Systems.
D. J. Levy, and E. P. Kahn. Jan 81, 10p CONF-810703-1(Rev.)
Contract W-7405-ENG-48
IEEE Power Engineering Society summer meeting, Portland, OR, USA, 26 Jul 1981.

Because they speed numerical calculations and exhibit functional dependences, Edgeworth-type series are increasingly used to approximate and calculate LOLP's. They are usually sufficiently accurate for large power systems (> 15,000 MW), but can be very inaccurate for small systems or those with low forced outage rates. This is because the approximating Edgeworth-type series are appropriate only for continuous probability densities, while discrete lattice-type density functions describe a typical power system's probability properties. This paper investigates these inaccuracies for small systems (less than or equal to 5000 MW), working out specific examples in a numerical approach and examining in a numerical approach and examining underlying functional dependences in an analytic approach. (ERA citation 06:023412)

MCR-79-1333 PC **A16**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.

Solar-Central-Receiver Hybrid Power System, Phase I. Midterm Topical Report (Draft).
Jun 79, 363p
Contract AC03-78ET21038

An analysis was performed to identify the market for solar hybrid power systems technology. Cost/benefit ratios were calculated for first generation hybrid technology in nine US geographic regions for the year 1990. Parametric analyses on hybrid subsystems were performed to develop cost, preliminary design and performance data for the preferred system selection process. Subsystems analyzed include the collector/receiver subsystem, salt piping and salt heat exchangers, the salt storage subsystem, the nonsolar subsystem, and the electric power generation subsystem. The process and criteria for selecting the preferred system and the specifications of that system are given. (ERA citation 06:023338)

N81-26580/3 PC **A04**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
Technological Activities for High Performance Receivers.
Final Report.
G. Schmidt, E. Kirner, and H. Zewen. Dec 80, 86p BMFT-FB-T-80-133, UR-39979-79
In German; English Summary.

For solar thermal power plants, the energy transfer efficiency from the incident solar radiation into the heat transfer medium has a direct impact on the overall plant efficiency and influences the size of the cost effective collector field. For this reason technological activities were accomplished for high performance receivers to be operated in closed Rankine cycles with organic heat transfer media at temperatures between 350 C to 400 C and gas turbine cycles at temperatures between 800 C to 900 C. Under simulated test conditions the thermal and mechanical resistance of the structure and the behavior of different heat transfer media with respect to thermal efficiency and stability were analyzed.

PATENT-4 232 097
Not available NTIS
Department of Energy, Washington, DC.
Fuel Cell Oxygen Electrode.
Patent,
A. J. Bevolo, G. C. Danielson, H. R. Shanks, and M. F. Weber. Filed 7 Mar 79, patented 4 Nov 80, 6p PAT-APPL-6-018 211
Supersedes PAT-APPL-6-018 211.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An oxygen electrode for a fuel cell utilizing an acid electrolyte has a substrate of an alkali metal tungsten bronze of the formula: AXWO sub 3 where a is an alkali metal and X is at least 2, which is covered with a thin layer of platinum tungsten bronze of the formula: PtYWO sub 3 where Y is at least 0.8. (ERA citation 06:023699)

PB81-214157 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Laser Scanning Measurements on Solar Cell Test Pattern NBS-22.
Final rept. 1 Jun 80-30 Nov 81,
W. F. Lankford, P. Kowalski, and H. A. Schafft. May 81, 53p NBSIR-81-2260
Sponsored in part by Solar Energy Research Inst., Golden, CO.

The NBS laser scanner has been used to make measurements on the solar cell test pattern, NBS-22, to verify the theoretical calculations of Sawyer, Lehovec, and Fedotowski. The photovoltaic response from cells with controlled sheet resistance step changes and breaks in the metallization contact to the cell was measured and compared to the theoretical predictions. Laser scanner limits of resolution were identified and proposed improvements were discussed. Preliminary measurements indicate that it is possible to measure the sheet resistance of the emitter layer of solar cells with an accuracy of several percent, using the laser scanner.

PB81-216079 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Water Use by Coal-Fired Power Plants in 1975,
Norman L. Dalsted, and John W. Green. Mar 81, 50p AGESS-810326

Steam electric generation plants require large quantities of water for dissipation of heat and waste disposal. Major systems in place are once-through, cooling tower, cooling ponds, and combination systems involving two or more of these systems. Cooling tower systems are becoming more prevalent as water withdrawal requirements are less and heat is released through evaporative techniques. But closed evaporative methods are large consumers of water. Assessment of water requirements of existing coal-fired steam power generation facilities provides essential input for analyses of the impact of new coal-fired facilities on water and other natural resources. The report summarizes water use of coal-fired power plants of over 100 megawatts in 1975.

PB81-218828 PC **A03**/MF **A01**
Miljoestyrelsen, Copenhagen (Denmark).
Environmental Studies for Conventional Power Plants (Miljoeundersoegelsen for Konventionelle Kraftvaerker).
Apr 79, 41p VEJLEDNING-1/1979, ISBN-87-503-2889-1
Text in Danish, abstract in English.

The purpose of this booklet is to define which environmental aspects should be investigated and how these investigations should be conducted when an application is made to construct a power plant or to alter or expand an existing power plant if such a change could increase pollution from the plant in question. The booklet is intended to help standardize procedures, although concrete cases may require adaptation of the regulations contained in it.

PB81-866519 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Coal-Fired MHD Generators and Power Generation Reports. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 205p

This bibliography contains cites of reports for a number of government supported research, development, and engineering programs and studies relating to coal-fired MHD generators used for generating power. Techniques, materials, equipment, systems, and facilities are all considered from technical, environmental, economic, and commercial points of view. (Contains 170 citations fully indexed and including a title list.)

PB81-871485 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electric Power Generation Via Tides and Waves. January, 1974-June, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jun 81.
Jul 81, 73p

The use of wave and tidal energy for the generation of electrical power is considered. Emphasis is placed on projects in the Bay of Fundy; however, potential sites are worldwide. The environmental and economic aspects of energy storage are stressed. The tidal characteristics of selected sites are reviewed. (Contains 80 citations fully indexed and including a title list.)

SAND-80-1987 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Pulsed Power for Electromagnetic Launching.
M. Cowan. Dec 80, 27p
Contract AC04-76DP00789

There are system advantages to producing power for electromagnetic propulsion by real-time generation rather than by a sequence of generation-storage-switching. The best type of generator for this purpose is the flux compression generator. Different types of flux compression generator which have been developed at Sandia National Laboratories are reviewed and their applications to electric launching are discussed. New experimental facilities for producing more powerful generators are described and cost comparisons are made. (ERA citation 06:022426)

SAND-80-2477 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Central-Receiver Test Facility (CRTF) Cost History.
R. G. Lundgren, and J. V. Otts. May 81, 61p
Contract AC04-76DP00789

The total cost distribution for the Central Receiver Test Facility is broken down into design, construction, and procurement categories. The percentage of recurring and nonrecurring costs are given. It is found that concrete and steel totaled 21% of the total project cost. The time frames required to complete the major project events are delineated. (ERA citation 06:023341)

SAND-81-1107C PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Engineering Research Inst.
Automatic-Control-Algorithm Effects on Energy Production.
G. M. McNerney. 1981, 9p CONF-810226-6
Contract AC04-76DP00789
DOE/NASA wind turbine dynamics workshop, Cleveland, OH, USA, 24 Feb 1981.

Algorithm control strategy for unattended wind turbine operation is a potentially important aspect of wind energy production that has thus far escaped treatment in the literature. Early experience in automatic operation of the Sandia 17-m VAWT has demonstrated the need for a systematic study of control algorithms. To this end, a computer model has been developed using actual wind time series and turbine performance data to simulate the power produced by the Sandia 17-m VAWT operating in automatic control. The model has been used to investigate the influence of starting algorithms on annual energy production. The results indicate that, depending on turbine and local wind characteristics, a bad choice of a control algorithm can significantly reduce overall energy production. The model can be used to select control algorithms and threshold parameters that maximize long-term energy production. An attempt has been made to generalize these results from local site and turbine characteristics to obtain general guidelines for control algorithm design. (ERA citation 06:023410)

SAND-81-7113C PC **A02**/MF **A01**
General Electric Co., Philadelphia, PA. Advanced Energy Programs Dept.
Low-Cost, Actively-Cooled Linear Photovoltaic Receiver.
N. F. Shepard, Jr. 1981, 20p CONF-810526-14(Dr)
Contract AC04-76DP00789
15. IEEE PV specialists conference, Orlando, FL, USA, 11 May 1981.

The development of a novel receiver design for a linear focus concentrator is discussed. This design concept, which employs a pair of nested glass tubes, offers the potential for low-cost production through reduced material content and design simplicity. A specially configured inner borosilicate glass tube functions as the mounting surface for the solar cell circuit in this dual focus receiver geometry. This inner tube, which is capped at each end to provide an interior dead air space, is inserted within a 2 inch ID glass pipe which is part of the Corning Pyrex beaded pressure process piping system. The selected receiver coolant, which is designated as Synfluid (2 centistokes kinematic viscosity), is circulated through the outer glass pipe in direct contact with the solar cell circuit active area. The concentrated irradiance from the parabolic trough impinges on the outer glass pipe and is optically transmitted through the clear synthetic mineral oil to the solar cell circuit. A prototype receiver of this design has been installed in a parabolic trough and subjected to a series of characterization tests to evaluate both thermal and electrical performance. (ERA citation 06:021780)

SERI/PR-8063-1-T1 PC **A04**/MF **A01**
Delaware Univ., Newark. Inst. of Energy Conversion.

Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Quarterly Progress Report, March 1-June 1, 1979.
Aug 79, 66p
Contract AC02-77CH00178

Progress has been made on improving the photon efficiency of the planar CdS/Cu sub 2 -S solar cell. Currents in excess of 20 mA/cm exp 2 have been achieved. Mixed sulfide solar cells responsive to heat treatment are now being produced. The morphology of the Cu sub 2 S/CdZnS junction has been examined and found to be significantly different than the morphology on CdS/Cu sub 2 S cells. Efficiencies measured under ELH simulation approaching 8% have been achieved. Work in the analytical task has focused on establishing the experimental techniques to study the trap levels in the CdS and to provide a working model for the voltage instabilities in some (CdZn)S/Cu sub 2 S cells. Cells under roof top exposure continue to be monitored. (ERA citation 06:021782)

SERI/PR-8063-1-T3 PC **A03**/MF **A01**
Delaware Univ., Newark. Inst. of Energy Conversion.
Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Quarterly Progress Report, December 1, 1978-March 1, 1979.
Aug 79, 35p
Contract AC02-77CH00178

The development of the planar junction CdS/Cu sub 2 S solar cell has been continued. Experiments have been conducted with varying thicknesses of Cu sub 2 S to determine whether the need for light trapping can be reduced by utilizing thick Cu sub 2 S layers. Further optical analysis of the influence of texturing on light trapping in the cell have been conducted. In the development of a (CdZn)S/Cu sub 2 S cell, a major effort has been expended in determining the details of the junction morphology. A wide range of analytical work has continued. Preliminary data has been obtained on cells sealed behind sheet glass and cells with integral electron beam evaporated glass coatings. (ERA citation 06:021783)

SERI/PR-8063-1-T4 PC **A04**/MF **A01**
Delaware Univ., Newark. Inst. of Energy Conversion.
Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Quarterly Progress Report, September 1-December 1, 1978.
Jun 79, 54p
Contract AC02-77CH00178

The CdS/Cu sub 2 S cell development effort was directed toward the planar junction cell. This junction gives a higher open circuit voltage than that achieved with the highly textured cell structure. Optical measurements have shown that applying a two-layer anti-reflection coating to the planar cell does not achieve the high photon economy shown by the textured structure. Total reflectance measurements have revealed that this is due to the lack of light trapping in the planar structure. Modified cell designs are now being developed with the planar junction necessary for high open circuit voltage while achieving the necessary light trapping. Work on the (CdZn)S/Cu sub 2 S cell has revealed that cell performance is extremely sensitive to the method of Cu sub 2 S producton. Appropriate structural studies have been initiated to identify the underlying reasons. Theoretical analysis and modeling of the current flow in the Cu sub 2 S layer has shown that the conventional one-dimensional analysis can lead to significant errors in interpreting the effects of sheet resistance. A rigorous two-dimensional current analysis is being conducted. The importance of the changes in absorption coefficient of the Cu sub 2 S stoichiometry has been identified and the relation between stoichiometry, resistivity, and absorption coefficient derived. On the basis of a review of the encapsulation task in the large scale silicon array program it has been determined that inorganic glasses are probably the only viable encapsulant for a CdS/Cu sub 2 S cell. (ERA citation 06:021784)

SERI/PR-8309-1-T4 PC **A06**/MF **A01**
Delaware Univ., Newark. Inst. of Energy Conversion.
Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Annual Report, September 1, 1979-August 31, 1980.
Dec 80, 107p
Contract AC02-77CH00178

The primary goal of this program, increasing the conversion efficiency of a thin-film cell based on CdS/Cu sub 2 S, has been achieved. A number of (CdZn)S/Cu sub 2 S cells have been made with conversion efficiencies in excess of 10% when tested in collimated sunlight. The highest efficiency achieved was 10.2% for a cell with 16% Zinc which had the following parameters; V/sub oc/ = 0.60V, J/sub sc/ = 22.8 mA/cm exp 2 (pro-rated to 100 mW/cm exp 2) FF = 74.9%. Further improvement in the performance of CdS/Cu sub 2 S cells beyond the previously reported 9.2%, was found to be limited by deficiencies in the fundamental knowledge and control of the Cu sub 2 S layer. A number of process changes in the production of CdS/Cu sub 2 S cells have been explored and are reported on. Transient capacitance measurements on CdS/Cu sub 2 S cells and further development of an integral encapsulation are also reported. (ERA citation 06:021785)

SERI/PR-9190-1-T1 PC **A03**/MF **A01**
Joint Center for Graduate Study, Richland, WA.
Investigation of Solar Cells Based on Cu sub 2 O. Progress Report, June 1, 1980-November 30, 1980.
L. C. Olsen. Feb 81, 34p
Contract AC02-77CH00178

Progress was made in three areas: microstructure of Cu sub 2 O substrates; correlation of Cu sub 2 O microstructure with Cu/Cu sub 2 O cell properties; and in fabrication of Tl/Cu sub 2 O Schottky barriers. Characterization of Cu sub 2 O substrates with IMMA indicates that Cl is uniformly distributed through grains, Mg precipitates at grain boundaries and Na and Fe precipitates occur throughout the material. It is clear that the presence of Cl results in lower p-type resistivities. Previous photoresponse scans established that grain boundaries are not significantly active concerning minority carrier recombination. I-V analyses of Cu/Cu sub 2 O cells indicate that leakage current components are a result of distributed effects, and not a grain boundary mechanism. It is not yet clear whether the distributed effects are strictly a surface effect, or a result of bulk defects such as Na and Fe precipitates. Tl/Cu sub 2 O Schottky barrier studies are progressing well. This device structure is being used as a means of determining if a significant built-in voltage can be achieved with a Cu sub 2 O cell. Problems were encountered concerning deposition of thin Tl films. The films tend to agglomerate. Substrates will be cooled to counter the apparent lateral diffusion. V/sub oc/ values greater than 0.6 volts were obtained with thick film Tl/Cu sub 2 O cells, however. These results suggest an improved built-in potential was achieved. (ERA citation 06:021786)

SERI/PR-9234-2-T1 PC **A03**/MF **A01**
Motorola, Inc., Phoenix, AZ. Solar Energy Dept.
Photovoltaic Mechanisms in Polycrystalline Thin-Film Silicon Solar Cells. Quarterly Technical Progress Report No. 2, 1 November 1980-31 January 1981.
B. L. Sopori. 29 Aug 81, 44p
Contract AC02-77CH00178

Results described in this report clearly indicate that high quality small area diodes can be fabricated with negligible edge effects. It is shown that these devices can be used to determine carrier transport mechanisms, which, in turn, are related to the nature of defects present in the substrate. The sectioning technique, in conjunction with other techniques described previously, enables a detailed analysis of the nature of defects (and their propagation paths). A unified approach towards applications of a two-wavelength laser scanner for photovoltaic material/device characterization is discussed in the appendix. (ERA citation 06:021788)

SERI/PR-9372-1-T1 PC **A05**/MF **A01**
RCA Labs., Princeton, NJ.
Amorphous Silicon Solar Cells. Quarterly Report No. 1, 1 October 1980-31 December 1980.
D. E. Carlson, I. Balberg, R. S. Crandall, J. Dresner, and B. Goldstein. Feb 81, 84p
Contract AC02-77CH00178

Progress is reported on the following: theoretical modeling, deposition and doping studies, experimental methods for the characterization of a-Si:H, formation of solar-cell structures, theoretical and experimental evaluation of solar-cell parameters, and stability studies. (ERA citation 06:021791)

SERI/TR-8063-1-T2 PC **A07**/MF **A01**
Delaware Univ., Newark. Inst. of Energy Conversion.
Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Final Report, September 1, 1978-August 31, 1979.
Dec 79, 127p
Contract AC02-77CH00178

Research on the planar CdS/Cu sub 2 S cell to increase the short circuit currents to the levels achieved with the 9.15% textured cell is given. It was established early in the contract that light trapping is essential for high currents and a front surface texturing process has been developed to achieve this. As a result, short circuit currents have been raised to over 21.0 mA/cm exp 2 . The highest efficiency achieved with the planar junction cell during the contract was 7.81%. Cells heat treated to their highest short circuit currents have shown fill factors below the design requirement of about 74% thus putting a limit on achievable efficiency. Progress has been made on improving the performance of the (CdZn)S/Cu sub 2 S again with the major emphasis being on improved short circuit currents. Modifying the CdZn/S deposition procedure has resulted in considerably improved short circuit currents to over 21 mA/Cm exp 2 , and a cell efficiency of 8.19% has been recorded. Fundamental studies have focused on the influence of substrate composition and heat treatment on junction field and collection efficiency. Quantitative analysis has been carried out of the optimal material parameters required to maximize energy converson efficiency. It has been shown a relatively narrow range of properties in the CdS and Cu sub 2 S is necessary to achieve the highest efficiencies. The encapsulation task has focused on trial depositions of glass applied by electron beam evaporation. (ERA citation 06:021794)

10C. Energy Storage

ANL/OEPM-80-17 PC **A06**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA.
Research, Development, and Demonstration of Nickel-Iron Batteries for Electric Vehicle Propulsion. Annual Report for 1980.
Mar 81, 114p
Contract W-31-109-ENG-38

The FY 1980 program continued to involve full-size, prototype cell, module and battery fabrication and evaluation, aimed at advancing the technical capabilities of the nickel-iron battery, while simultaneously reducing its potential cost in materials and process areas. Improved Electroprecipitation Process (EPP) nickel electrodes of design thickness (2.5 mm) are now being prepared that display stable capacities of 23 to 25 Ah for the C/3 drain rate at 200+ test cycles. Iron electrodes of the composite-type are delivering 24 Ah at the target thickness (1.0 mm). Iron electrodes are displaying capacity stability for > 1000 test cycles in continuing 3 plate cell tests. Finished cells have delivered 57 to 61 Wh/kg at C/3, and have demonstrated cyclic stability to 500+ cycles at 80% depth of discharge profiles at Westinghouse. A 6-cell module that demonstrated 239 Ah, 1735 Wh, 48 Wh/kg at the C/3 drain rate has also been evaluated at the National Battery Test Laboratory, ANL. It operated for 327 test cycles, to a level of 161 Ah at the C/3 rate, before being removed from test. Reduction in nickel electrode swelling (and concurrent stack starvation), to improve cycling, continues to be an area of major effort to reach the final battery cycle

life objectives. Pasted nickel electrodes continue to show promise for meeting the life objectives while, simultaneously, providing a low manufacturing cost. Refinements have occurred in the areas of cell hardware, module manifolding and cell interconnections. These improvements have been incorporated into the construction and testing of the cells and modules for this program. Temperature tests at 0 exp 0 C were performed on a 6-cell module and showed a decrease in capacity of only 25% in Ah and .29% in Wh as compared to 25 exp 0 C performance. Additional tests are planned to demonstrate performance at -15 exp 0 C and 40 exp 0 C. (ERA citation 06:023609)

DOE/ET/26940-T1 PC **A18**/MF **A01**
Maryland Univ., College Park. Inst. for Physical Science and Technology.
Review of National Techno-Economic Energy Models with Particular Reference to the Evaluation of Energy Storage Considerations.
W. B. Widhelm, and T. H. Doyle. Dec 80, 404p
Contracts FG01-79ET26805, AS05-77ET26940

The basic econometric considerations used in developing National Techno-Economic (NTEE) models are presented, methods for comparing NTEE models are discussed, specific NTEE models are described in detail, and possible uses of NTEE models in energy storage studies are examined. (ERA citation 06:023606)

LBL-12445 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Failure Modes of Na-beta Alumina.
L. C. De Jonghe, L. Feldman, and A. Buechele.
Apr 81, 6p CONF-810566-2
Contract W-7405-ENG-48
International conference on fast ionic transport in solids, Gatlinburg, TN, USA, 18 May 1981.

Sodium-beta and beta alumina solid electrolytes may, under certain conditions, degrade when used in sodium/sulfur cells. Degradation of sodium-beta aluminas can take two forms: Mode I and Mode II. Mode I is the well-documented electro-mechanical propagation of a preexisting microcrack in the surface of the electrolyte. The critical electrode current densities, j/sub crit/, were determined below 100 exp 0 C using acoustic emission detection during electrolysis. The temperature dependence and magnitudes of j indicate that the applied voltage is an important factor. Mode II, a degradation involving internal sodium formation is briefly reviewed. (ERA citation 06:022091)

LBL-12514 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Applied Battery and Electrochemical Research Program Report for Fiscal Year 1980.
E. Cairns, L. DeJonghe, J. Evans, F. McLarnon, and R. Muller. Apr 81, 135p
Contract W-7405-ENG-48

The Exploratory Battery R and D area provides for the study of new electrochemical couples, or of new approaches to known battery systems. High temperature systems under investigation include Ca/molten salt/FeS sub 2 , Li/Lil-Al sub 2 O sub 3 /TiS sub 2 , and Na/ beta "-Al sub 2 O sub 3 /SCl sub 4 -NaCl-AlCl sub 3 . Ambient temperature systems being studied are Li/So sub 2 /C and Zn/NaOH/Fe(CN) sub 6 . New electrode/electrolyte formulations for Zn/KOH/NiOOH and Li/organic electrolyte/TiS sub 2 cells are being investigated, and a status study of ambient temperature secondary lithium batteries was conducted. Projects grouped in the Engineering-Science Research area include morphological and optical studies of battery electrodes in Pb/H sub 2 SO sub 4 /PbO sub 2 , Zn/KOH/NiOOH, and metal/air cells; and a thermal management study of the high-temperature Li/molten salt/FeS Battery. Improvements in alkaline (Zn/NiOOH and Fe/NiOOH) battery performance are being sought. Materials Research seeks to identify, characterize, and improve the materials and components to be used in batteries and electrochemical processes. Basic investigations have led to the discovery of a novel all-solid electrode structure for possible use as negative electrodes in molten-salt cells. New ternary lithium-transition metal oxides have been identified as possible electrode reactants for use in similar systems. Projects aimed at developing improved separators for high-temperature Na/S and Li/S cells are focusing on such materials as beta "-alumina, NASICON, conducting glasses, and novel superionic conductors. New polymeric separators are being studied for use in ambient-temperature Li/TiS sub 2 cells, and composition profiles in molten-salt electrolytes are being analyzed. Brief summaries of the separate research projects are presented. (ERA citation 06:022092)

N81-26556/3 PC **A11**/MF **A01**
Comstock and Wescott, Inc., Cambridge, MA.
Extended Development of a Sodium Hydroxide Thermal Energy Storage Module.
Final Report.
R. E. Rice, P. E. Rowny, and B. M. Cohen. Sep 80, 235p NASA-CR-165206, DOE/NASA/0138-1
Contracts DEN3-138, DE-A101-77ET-26945

The post-test evaluation of a single heat exchanger sodium hydroxide thermal energy storage module for use in solar electric generation is reported. Chemical analyses of the storage medium used in the experimental model are presented. The experimental verification of the module performance using an alternate heat transfer fluid, Caloria HT-43, is described. Based on these results, a design analysis of a dual heat exchanger concept within the storage module is presented. A computer model and a reference design for the dual system (storage working fluid/power cycle working fluid) were completed. The dual system is estimated to have a capital cost of approximately one half that of the single heat exchanger concept.

N81-26559/7 PC **A05**/MF **A01**
Energietechnik G.m.b.H., Essen (Germany, F.R.). Studiengesellschaft fuer Energie-Umwandlung, -Foerlwirung und -Anwendung.
Long-Term Energy Storage Tanks for Dwellings and Solar House Architecture.
Final Report.
Dec 80, 93p BMFT-FB-T-80-173-PT-A/B, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in Cooperation with Baehr U. Gansfort, Architekten.

No abstract available.

PB81-872582 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pumped Storage for Hydroelectric Power. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 66p

This retrospective bibliography covers the design, development, construction, and characteristics of surface and underground pumped storage for hydroelectric power. Many citations concern specific pumped storage projects and facilities worldwide. There is some consideration of research and experimental results of pumped storage studies, including modeling. (Contains 56 citations fully indexed and including a title list.)

SAND-81-7115C PC **A02**/MF **A01**
Exxon Research and Engineering Co., Linden, NJ. Advanced Energy Systems Labs.
Recent Progress on Exxon's Circulating Zinc Bromine Battery System.
R. J. Bellows. 1981, 19p CONF-810642-4
Contract AC04-76DP00789
DOE battery and electrochemical contractor's conference, Washington, DC, USA, 2 Jun 1981.

The design, performance, and factory cost of Exxon's circulating zinc bromine batteries are described. The Exxon system has demonstrated stable performance in scale-ups to 3- and 10-kWh sub-modules. Cost studies based on recently demonstrated extrusion and injection molding techniques, have shown that this battery, with plastic electrodes, bipolar stacks, Br sub 2 complexation, and circulating electrolytes, could be produced (20 kWh units, 100,000 units/year) at a factory cost of $28/kWh (excluding R.O.I., and various indirect overheads). (ERA citation 06:022093)

UCRL-84347 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Safety of Isotropic Flywheels.
M. W. Schwartz. 30 Apr 81, 11p CONF-810373-1
Contract W-7405-ENG-48
International conference on fracture, Cannes, France, 29 Mar 1981.

A probabilistic safety criterion for isotropic flywheel rotors is established based on the tolerated noncontainment failure rates of commercial aircraft turbojet engine rotors. A technique is developed combining reliability with fracture mechanics, and a sample calculation provided, to show the energy-storage levels that isotropic flywheel rotors could achieve within the constraints of this safety criterion. (ERA citation 06:022087)

11.
MATERIALS

11A. Adhesives and Seals

AD-A100 714/5 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Studies of the Effects of Sub-Zero Storage Temperatures on the Properties of Pre-Mixed Polysulphide Sealants,
John W. Barber, Peter J. Hanhela, Robert H. E. Huang, and D. Brenton Paul. Oct 80, 30p Rept no. MRL-R-656

Pre-mixed polysulphide sealants were stored at -20, -30 and -40 C for selected intervals and then tested for conformity for the requirements of the appropriate MIL-specification in regard to cure rate or hardness, application time, tack-free time and peel strength. For Pro-Seal 899 and PR-1750 sealants, no significant change in hardness or peel strength occurred after prolonged storage at temperatures of -20 C and below; a minor decline in peel strength occurred with PR-1422. Application properties were also maintained for extended periods and at -40 C tests terminated only due to consumption of samples after storage times ranging from 7 to 16 weeks. These storage lives far exceed manufacturers' limits. Batch variations and stricter observation of class requirements could influence recommended storage times but at -40 C even materials such as PR-1750, which have a close tolerance in application life rating, may be pre-mixed and be safely stored for at least 10 weeks. Both class A and B sealants may be stored in pre-mixed form provided their application lives are at least 2 hours. Thawing is most conveniently and efficiently achieved by allowing the frozen sealant to equilibrate at room temperature. (Author)

AD-A101 033/9 PC **A03**/MF **A01**
Hughes Aircraft Co., Los Angeles, CA. Space and Communications Group.
Hardened Solar Array High Temperature Adhesive.
Final rept. Apr 80-Jan 81,
C. Beard, C. Sherwood, D. Basiulis, P. Magalianes, and G. Wolff. Apr 81, 50p HAC-SCG-10011R, AFWAL-TR-81-2017
Contract F33615-80-C-2015

Ultrahigh molecular weight m-carborane-siloxane polymers exhibit good stability at high temperature in vacuum. This thermal stability coupled with desirable viscoelastic properties make these materials attractive as thermoplastic adhesives for solar cell attachment to solar panel substrates, especially for hardened systems. Unfortunately, development of a reproducible chemical synthesis for these polymers has eluded all efforts in recent years. In this current effort to reproducibly prepare these ultrahigh molecular weight elastomers, major progress has been made. This progress has resulted from careful and orderly experimentation involving the main elements of the problem, namely: (a) purification of reactants and solvents,

(b) preparation, workup, and characterization of monomers, (c) preparation and workup of prepolymers, (d) development of a trace level, silanol end group analysis for estimating prepolymer advanceability, and (e) prepolymer advancement to the final polymer. Significant additional progress in the prepolymer preparation and advancement steps is still required for definition of a reproducible process for preparing the ultrahigh molecular weight material. Pending achievement of such progress, adhesive formulation efforts are limited. (Author)

DOE/CS/15362-T1 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Improved Solar Collector Sealants. Semiannual Report, October 1980-April 1981.
L. C. Scala, L. W. Frost, W. M. Alvino, and G. M. Bower. 20 Apr 81, 31p
Contract AC04-78CS15362

Synthetic modifications of silicones and fluoroelastomers, involving bulky substituents, occasional rigid linkages, interpenetrating networks of other polymers, and use of unconventional crosslinking methods, have been explored in order to decrease siloxane bond interchange and fluorocarbon chain crystallization, thought to be the cause of excessive compression set and emission of condensable volatiles. Siloxane diamines and diphenols have been synthesized for use as fluoroelastomer crosslinkers and chain separators. A number of commercially available elastomers were acquired and tested for tensile strength, modulus, elongation, hot and cold compression sets, volatiles, and hardness change, according to the proper ASTM methods. Only three of the materials failed any test, and that was low temperature compression set. (ERA citation 06:023372)

PATENT-4 230 959
Not available NTIS
Department of Energy, Washington, DC.
Magnetohydrodynamic (MHD) Channel Corner Seal.
Patent,
F. R. Spurrier. Filed 6 Mar 79, patented 28 Oct 80, 14p PAT-APPL-6-018 099
Supersedes PAT-APPL-6-018 099.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A corner seal for an MHD duct includes a compressible portion which contacts the duct walls and an insulating portion which contacts the electrodes, sidewall bars and insulators. The compressible portion may be a pneumatic or hydraulic gasket or an open-cell foam rubber. The insulating portion is segmented into a plurality of pieces of the same thickness as the electrodes, insulators and sidewall bars and aligned therewith, the pieces aligned with the insulator being of a different size from the pieces aligned with the electrodes and sidewall bars to create a stepped configuration along the corners of the MHD channel. (ERA citation 06:023693)

11B. Ceramics, Refractories, and Glasses

AD-A101 074/3 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Metallurgy and Materials Science.
Oxidation of Non-Oxide Ceramics.
Annual rept. Apr 80-Apr 81,
T. E. Mitchell, R. M. Cannon, D. M. Mieskowski, N. J. Tighe, and A. H. Heuer. 12 Jun 81, 50p
AFOSR-TR-81-0530
Contract F49620-78-C-0053

Tracer studies involving CVD single crystals oxidized in oxygen 16 and oxygen 18 were unsuccessful in indicating the direction of diffusing species during oxidation of SiC. A refinement of this technique is planned. Research is also continuing on the characterization of the spherulitic growth which appears during oxidation. The influence on densification of pore curvature, dihedral angle, applied stress and internal pore pressure was undertaken from a theoretical point of view. The results using a simple model indicate that at low dihedral angle (less than 60 degrees) there is an equilibrium porosity in a polycrystalline material; for such a material there is no barrier to nucleation of cavities in dense material. At intermediate dihedral angles, pores with few sides would shrink and disappear, whereas those with many sides would initially shrink but would reach an equilibrium size at which densification would stop. In this case grain growth of the large pores would reduce the number of sides for the pore and promote further densification. For such materials there would be a small barrier to nucleation. (Author)

DE81023051 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Physical and Chemical Characterization of Interfaces by Electron Optical Methods.
G. Thomas, R. Gronsky, O. L. Krivanek, and R. K. Mishra. Apr 81, 28p LBL-11413, CONF-800765-8
Contract W-7405-ENG-48
LLR/MMRD international symposium of interfaces in glass-metal systems, Berkeley, CA, USA, 28 Jul 1980.
Microfiche only after original copies are exhausted.

Although the study of ceramics using transmission electron microscopy (TE) lagged behind metallurgy because of specimen preparation difficulties and because many ceramics are ionization sensitive to 100 kV electron beams, today there is considerable research activity. This is due to perfection of ion thinning methods (first devised by Castaing in the early 1950s actually for metals) and improvements in instrumentation, particularly high voltage, high resolution and analytical microscopes. These developments and many applications have been summarized recently and will not be given in any more detail in this review. However, it is important not to underestimate the severe problems of specimen preparation methods for ceramic materials. (ERA citation 06:023932)

DE81024065 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Depth Resolved Measurements of Hydrogen Isotope Exchange in Carbon.
W. R. , Magee, C. W. Wampler. 1981, 11p
SAND-81-0302C
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

High resolution measurements of the depth profiles of hydrogen and deuterium implanted in carbon were made using SIMS. Nuclear reaction analysis was used to calibrate the concentration scales for the deuterium. The depth profiles of low fluence H and D implants show the D extends to slightly greater depths than the H at 1.5 keV. The retention of deuterium at high fluences was in good agreement with predictions of a saturation model. Depth profiles were also measured on samples implanted with 10 exp 18 D/cm exp 2 at 1.5 keV followed by hydrogen implants of 2 x 10 exp 17 H/cm exp 2 at the same energy. C comparison between these measured profiles and profiles calculated using the local mixing model shows that the model predicts the depth dependence of the H, D exchange reasonably accurately. (ERA citation 06:023933)

DOE/PR/06010-T5 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Materials Research for the Clean Utilization of Coal. Quarterly Progress Report, January-March 1981.
1981, 24p
Contract AI01-76PR06010

Data Center personnel have received training in the use of the new Data Base Management System (DBMS). The Failure Information Data Base has been transferred to the new DBMS and is now operative on it. The normal activities of the Data Center have proceeded, especially with regard to production of the book of data for materials for coal gasification. This report describes the twelve station creep facility and presents data obtained on fused-cast-alumina and hot-pressed silicon carbide. (ERA citation 06:023029)

GEPP-TIS-533 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Microstructure Examination and Peak Crystallization Activation Energy of MS-11A Molybdenum Sealing Glass-Ceramic.
R. K. Spears, and L. L. Johnson. 7 May 81, 32p
Contract AC04-76DP00656

Differential thermal analysis was used to determine the crystallization characteristics of a molybdenum sealing glass-ceramic designated as MS-11A. This glass--ceramic's crystalline phase is zinc orthosilicate. By varying the heating rates from 2 exp 0 C/min to 40 exp 0 C/min, the initiation of crystallization, the peak crystallization temperature and the activation energy of crystallization were determined. Both annealed and unannealed glass-ceramic samples were evaluated; however, there was no significant difference between the results of these two parameters. The activation energy of crystallization was calculated at approximately 40 kcal/mole. The minimum temperature of crystallization was 790 exp 0 C at a rate of 2 exp 0 C/min and 930 exp 0 C for a rate of 40 exp 0 C/min. The microstructure of all DTA samples was examined. A typical structure consisted of submicron grains of crystalline Zn sub 2 SiO sub 4 in a glass matrix. (ERA citation 06:020511)

PB81-214819 PC **A06**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Ceramic Engineering.
Calcia Stabilized Zirconia Castable.
Final rept.,
J. Benzel, J. Cochran, R. Kolarik, K. Lee, and E. McGee. Jun 80, 113p BUMINES-OFR-65-81
Grant G0177145

This report presents the results of research on castable refractories made from calcium aluminate and zirconia suitable for use in high temperature furnaces. The results indicated that reductions in the amounts of zirconia compared with conventional materials were possible with resultant materials and energy cost savings. The new formulations were demonstrated in producing refractory kiln furniture.

PB81-214868 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park. Materials Research Lab.
Innovative Technology for Fabrication of Ceramics: EDS Rapid Solidification Process Application to Specialized Materials.
Final rept. 30 Jun 75-30 Sep 80,
Della M. Roy, Rustum Roy, and T. P. O'Holleran. 15 Nov 80, 53p BUMINES-OFR-66-81
Grant G0155191

This report presents results of innovative research on a novel rapid solidification technology method to produce fine ceramic powders of many compositions with unique properties. The process uses salt solutions and includes two steps, the first to evaporate the liquid and the second to very rapidly decompose the salt to a very fine powder. The process has been demonstrated in terms of the following material applications: aluminates, ferrites, phosphors, ionic conductors, and cements. This new technique of producing ceramic powders offers a number of potential advantages over existing methods such as ability to produce complex compositions, lower energy requirements, and improved properties.

PB81-807166 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Nitride Ceramics and Refractories. 1976-May, 1981. (Citations from the Engineering Index Data Base).
Rept. for 1976-May 81.
Jul 81, 221p
Supersedes PB80-806649. For the companion Published Search of the NTIS Data Base, see PB80-804289.

Reports covering the properties, structure, preparation, fabrication, testing, and applications of silicon nitride are cited. Applications include gas turbine components, dielectrics, tools, magnetohydrodynamic generators, and use in coal gasification plants. Reports on silicon oxynitride

and silicon metal oxynitride are included. (This updated bibliography contains 216 citations, 59 of which are new entries to the previous edition.)

PB81-807174 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Nitride Ceramics and Refractories. 1977-May, 1981. (Citations from the NTIS Data Base).
Rept. for 1977-May 81.
Jul 81, 249p
Supersedes PB80-806631. For the companion Published Searches of the Engineering Index and International Aerospace Abstracts Data Base, see PB80-806649 and PB80-804289.

Reports covering the properties, structure, preparation, fabrication, testing, and applications of silicon nitride are cited. Applications include gas turbine components, nuclear reactor materials, dielectrics, bearings, tools, heat exchangers, magnetohydrodynamic generators, and use in coal gasification plants. Reports on silicon oxynitride and silicon metal oxynitride are included. (This updated bibliography contains 244 citations, 74 of which are new entries to the previous edition.)

SAND-80-2423C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Crystallization in Mixed Alkali Silicate and Borosilicate Glasses in Contact with Molten Sodium.
L. C. Klein, and C. J. Brinker. 1981, 20p CONF-810528-5
Contract AC04-76DP00789
83. symposium on nucleation and crystallization in glasses, Washington, DC, USA, 3 May 1981, Portions of this document are illegible.

Six mixed alkali silicate and borosilicate glasses were heat treated in contact with molten sodium at temperatures between 300 and 450 exp 0 C. In all cases a sodium metasilicate layer grew from the contact surface into the sample. For glasses with a molar ratio of Li sub 2 O to Na sub 2 O equal to about one, the interface between the crystal layer and the glass was flat, and the thickness of the layer increased proportional to the square root of time. When the molar ratio was increased to about two, the metasilicate layer grew with a cellular morphology and the thickness of the layer increased linearly with time. (ERA citation 06:023950)

11C. Coating, Colorants, and Finishes

BNL-29501 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Concrete-Polymer Composites: Current Status and Future Research Needs.
L. E. Kukacka. Apr 81, 14p CONF-810653-1
Contract AC02-76CH00016
Plastics in material and structural engineering conference, Prague, Czechoslovakia, 23 Jun 1981.

When plastics are combined with mixtures of inorganic materials, high-strength, durable, fast-setting composites are produced. These materials are used in structural engineering and other applications, and as a result of the successes obtained to date, considerable research and development work is in progress throughout the world. One family of polymer-based composites receiving considerable attention is the concrete-polymer materials. Work in this area is directed toward developing new high-strength durable materials by combining cement and concrete technology with that of polymer chemistry. In addition to the significant property enhancement, many combinations of siliceous materials with polymers require lower energy inputs per unit of performance than either component alone. (ERA citation 06:023939)

DOE/ET/12292-T1 PC **A04**/MF **A01**
Airco Temescal Div., Berkeley, CA.
Development of Improved Corrosion- and Erosion-Resistance Coatings for Gas-Turbine Airfoils.
S. Shen. 1980, 58p
Contract AC03-78ET12292

The main objective of this program is to obtain a ceramic coating with sufficient density to prevent hot-corrosion element diffusion while accommodating the thermal induced stresses and strain encountered in the gas turbine airfoil application. A secondary objective is to include ceramic coatings for outer air seals and combustor components such as falseheads, crossover tubes, and igniters. In addition, these coatings may directly, or with minor modification, be of major interest for insulating diesel engine combustion zones. The application objective is to significantly enhance diesel and gas turbine engine durability when operating with minimally processed alternative fuels. Both steel tabs and IN-738 pins were used as substrate to be coated with Yttria-stabilized Zirconia using EB-PVD technique. Various bond layers including CoCrAlY, NiCrAlY and NiCoCrAlY were also deposited by PVD in a 100 kW coater followed by glass bead peening and vacuum heat-treatment at 1975 exp 0 F for four (4) hours. ZrO sub 2 (Y sub 2 O sub 3) top layers were deposited in a 200 kW coater with a pressure barrier system to enable oxygen gas being introduced during the coating process. Results are presented and discussed. (ERA citation 06:021999)

LBL-11668 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Simple Method for Adhesion Measurements.
S. S. Chiang, D. B. Marshall, and A. G. Evans.
Aug 80, 17p CONF-800765-6
Contract W-7405-EN-48
LLR/MMRD international symposium of interfaces in glass-metal systems, Berkeley, CA, USA, 28 Jul 1980.

An indentation method for determining the adhesion of interfaces between thin films and substrates has been developed. The method provides a quantitative measure of the interface fracture resistance and has the advantage of simplicity and reproducibility. The method has been demonstrated for a range of ZnO/Si systems and the adherence has been correlated with acoustic properties. (ERA citation 06:023941)

N81-26964/9 PC **A05**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Metallurgy and Materials Science.
Stress Generation in Thermally Grown Oxide Films.
Final Report.
A. J. Kumnick, and L. J. Ebert. 7 Jul 81, 77p
NASA-CR-164520
Contract NAG3-49

A three dimensional finite element analysis was conducted, using the ANSYS computer program, of the stress state in a thin oxide film thermally formed on a rectangular piece of NiCrAl alloy. The analytical results indicate a very high compressive stress in the lateral directions of the film (approximately 6200 MPa), and tensile stresses in the metal substrate that ranged from essentially zero to about 55 MPa. It was found further that the intensity of the analytically determined average stresses could be approximated reasonably well by the modification of an equation developed previously by Oxx for stresses induced into bodies by thermal gradients.

PB81-871121 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Use of Chromate Coatings for the Protection of Aluminum and Zinc Surfaces. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 46p

The use of chromate coatings for corrosion protection of aluminum and zinc are considered. Topics include passivation techniques, conversion coatings, testing methods, and the use of corrosion inhibitors. (Contains 64 citations fully indexed and including a title list.)

PB81-871865 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Antifouling Coatings for Marine Applications. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 89p

The use of protective coatings for the prevention of marine fouling is considered. The biochemistry of tin based organometallic compounds and their toxic properties are discussed. Emphasis is placed on the applications of these coatings to ship hulls and ocean thermal energy conversion systems. The life of the coatings is discussed in terms of controlled release of toxicants. (Contains 95 citations fully indexed and including a title list.)

PB81-872137 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Extrusion Coatings: Techniques and Applications. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 125p

The processes of extrusion coatings and their properties on various substrates are considered in this bibliography from world literature. Materials discussed include polyethylenes, ethylene methyl acrylates, polyesters, polypropylenes, and hot melts. (Contains 76 citations fully indexed and including a title list.)

11D. Composite Materials

AD-A100 643/6 PC **A05**/MF **A01**
Lowell Univ., MA. Coll. of Engineering.
Dynamic Composite Laminate Finite Element Analysis.
Final rept. Aug 78-Nov 79,
John O'Callahan, and John A. McElman. Mar 81, 94p AFWAL-TR-80-2027
Contract F33615-78-C-2052

The analysis of plate like structures such as blades built-up with composite laminate fibers requires the modification of an existing finite element computer program to include the coupling of in-plane stretching with out-of-plane bending of a plate. An industry standard computer program SAP IV was selected as host program to accept new composite plate finite element. The SAP IV Finite Element Computer Program was designed to accept new elements into its element library easily. The new element, in general, must be self contained since the general philosophy and program structure is 'overlayed' into the computer. The laminate composite plate element is the new element to be integrated into the element library. The new element named TYPE 9 is similar to element TYPE 6 in element description and input. The main difference is that element TYPE 9 has the ability to couple in-plane extension with out-of-plane bending which is possible with laminate plate behavior and theory. Element TYPE 9 is a quadrilateral element and is formulated from quadrilateral shape functions rather than by four triangles as in TYPE 6. Also, in general, TYPE 9 allows for material directions to be arbitrary for ease of material input descriptions. The element is modelled after the structure of element TYPE 6; therefore, element TYPE 9 can degenerate to element TYPE 6. (Author)

AD-A101 124/6 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Stabilization of Acrylic Fibers and Microstructure of Carbon-Carbon Composites.
Final rept.,
D. R. Uhlmann. 7 Jun 81, 33p AFOSR-TR-81-0526
Grant AFOSR-77-3466

The work on the stabilization of acrylic fibers has demonstrated that various mantle-core structures are observed at intermediate stages of stabilization, that the dark mantles seen in optical thin sections can be related to the etched mantles seen on exposure to solvents for PAN, that the mantles

seen on fractured fiber ends reflect the underlying structure of the partly-stabilized fibers, that the development of these various mantless with time depends on the nature of the precursor fibers and the processing conditions, that liquid droplets can be produced during fracture of fibers during stabilization, and that the fracture of even a small number of fibers can produce effective cementation of a yarn during processing. The study of the interaction between mesophase material and carbon fibers has directed attention to the precipitation, growth and coalescence of mesophase material, which processes require ordering of small molecules in a viscous medium. On this basis, dynamic motion in the fluid rather than the presence of nucleating substrates is suggested to be the controlling factor in the structural development. Where dynamic motion is restricted, as in the interstices of a yarn, mesophase formation and growth are also restricted. Alignment of mesophase material with a substrate is primarily controlled through motion of the mesophase droplets in flow, which generally do not wet the substrate. Certain well-order surfaces are wetted by the mesophase material, but the effect is primarily noted on surfaces of comparable size to the droplets. (Author)

N81-26185/1 PC **A06**/MF **A01**
Southwest Research Inst., San Antonio, TX. Dept. of Fire Technology.
Fire Test Methodology for Aerospace Materials. 1: Thermal and Smoke Toxicological Assessments of Graphite/Bismaleimide and Graphite/Epoxy Systems.
Final Report,
M. D. Kanakia, W. G. Switzer, G. E. Hartzell, and H. L. Kaplan. Oct 80, 124p NASA-CR-166196, SWRI-03-5565-001
Contract NAS2-10140

Both materials possess a high degree of thermal stability, with total heat release values being essentially identical under piloted ignition conditions over a range of 5 to 10 W/sq cm incident heat flux. The graphite/epoxy material had a tendency to auto-ignite at a lower heat flux (about 7 W/sq cm) and produced about 23 percent higher peak heat release rates, approximately 42 percent more carbon monoxide and considerably more smoke than the graphite/bismaleimide under conditions of piloted ignition. Toxicological potencies of smoke produced from the two composites were equivalent for 30 minute exposures. Potencies were also comparable to many common materials, such as wood. There was no evidence for the formation of an 'unusual toxicant' nor for any short term post-exposure toxicological effects.

11E. Fibers and Textiles

AD-A100 770/7 PC **A02**/MF **A01**
Universal Energy Systems, Inc., Dayton, OH.
Graphite Fiber Surface Analysis by X-Ray Photoelectron Spectroscopy and Polar/Dispersive Free Energy Analysis.
L. T. Drzal, and G. E. Hammer. Apr 81, 24p
AFWAL-TR-80-4143
Contract F33615-77-C-5040

Graphite fibers of less than 10 microns in diameter are used as the reinforcing agents in structural epoxy matrix composite materials. Their efficiency in reinforcing is determined to a large degree by their degree of bonding to the epoxy. Commercial surface treatments maximize this adhesion without quantifying the interaction. The purpose of this work has been to relate the surface composition of commercial treated and untreated fibers to the 'real' fiber surface incorporated in composites. Hercules A and HM filters, treated and untreated, have been studied using X-ray photoelectron spectroscopy (XPS) and contact angle measurements before and after a 300 C vacuum heat treatment. XPS spectra indicated multiple chemical states of carbon and oxygen and a reduction in the high energy binding state of carbon on the treated A fiber after vacuum heat treatment. Elemental surface concentrations have been calculated using corrected XPS peak areas. Contact angles were measured on these same fibers using a micro-Wilhelmy technique which incorporated eight liquids having a wide range of polar to dispersive free energy ratios. Determination of the fiber surface free energies and the proportions due to polar and dispersive components was made. Good Correlation was found between the oxygen concentration as measured by XPS and the change in polar/dispersive ratios for the fibers with surface treatments. (Author)

AD-A100 774/9 PC **A03**/MF **A01**
Army Natick Research and Development Labs., MA. Clothing, Equipment and Materials Engineering Lab.
Evaluation of Staple Polyester/Microfibrous Polyolefin Blended Batting as a Potential Thermal Insulating Material for clothing.
Technical rept.,
David A. Mikelson. Jun 80, 28p CE/MEL-213, NATICK-TR-81/007

The use of a new batting (composed of a blend of 43% polyester staple fibers and 57% polyolefin microfibers without binders) in lieu of the standard batting (composed of 100% staple polyester fiber with 10% resin binder) within the U.S. Army jacket and trouser liners was investigated. Initial laboratory characterization indicated that the new batting afforded thermal insulative protection equal to an equivalent weight of uncompressed standard polyester batting but half the thickness (bulk). However, this relationship did not translate into actual liner composite testing. The addition of cover fabrics and quilting changed the proportion and rate of radiative, convective, and conductive heat energy transfer thru these assemblies. Thus, at equivalent areal density (i.e., oz/yd sq.), the new material in unquilted panel form exhibited thermal resistance values ranging from 15 to 45% greater than that of the standard polyester batting in quilted panel form. Coincidently, the thickness of the unquilted new batting and quilted standard batting liner panels were equivalent. With laundering, the decrease in the thermal resistance values of the new batting composites coupled with a slight increase in that of the standard resulted in a basic equivalence of thermal insulative protection. Furthermore, surface area shrinkage ranged from 8 to 13% with the new batting composites versus 4% for the standard. It is concluded that this new batting is not a suitable substitute filling media within US Army field jacket and trouser lines. (Author)

AD-A101 146/9 PC **A06**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Textile Engineering.
Preparation and Analyses of Chemically Sorptive Yarns from Rayon and Acrylic Precursors.
Final rept. Oct 76-Mar 78,
Fred L. Cook. Dec 79, 122p GIT-E-27-646, NATICK/CEMEL-200, NATICK-TR-80-004, AD-E450 000
Contract DAAG17-76-C-0092

Research was conducted to develop and demonstrate a continuous process for production of a highly sorptive carbon fiber meeting specific strength and denier requirements.

PB81-214470 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
The Effect of Twist and Twill Directions on Tensile Properties of Twill Fabrics.
Research note,
K. Kumaraswamy, and G. M. Venkatesh. Jul 76, 20p MP-84

It is generally known that the prominance of twill lines in a twill fabric is influenced by the direction of twist in the warp and weft yarns. Normally the left hand warp twill (also called 'S' twill) is more prominent with Z-twist in warp and weft and the right hand warp twill (also called 'Z' twill) is more prominent with S-twist in warp and weft. This interaction of twist and twill directions has some significant influence on certain physical properties of the fabric. This particular report gives some interesting results on the effect of the interaction between twist and twill directions on tensile properties of the twill fabrics. The results of this study show that the warpway tensile strength is higher for crossed twill constructions (prominent twills) with the exception of 2/2 twill weave, when the warp and weft yarns in the fabric are like twisted as compared to parallel twill constructions (non-prominent twill). The difference in warpway tensile strength has been attributed to the tightness of the structure in cross twill constructions and the bedding properties, being better for these constructions.

PB81-214728 PC **A08**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Technological Conference (19th), February 10-11, 1978. Volume I. Proceedings.
1978, 171p
Prepared in cooperation with Bombay Textile Research Association and South India Textile Research Association. See also Volume 2, PB81-214736.

Contents:
Spinning;
Fabric manufacture;
General.

PB81-214736 PC **A08**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Technological Conference (19th), February 10-11, 1978. Volume II. Proceedings.
1978, 152p
See also Volume 1, PB81-214728. Prepared in cooperation with Bombay Textile Research Association and South India Textile Research Association.

Contents:
Wet processing:
Dyeing & printing;
Wet processing:
new chemical finishes;
Blended fabrics;
Engineering;
Fibre Science.

PB81-214744 PC **A04**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Technological Conference (20th), February 9-10, 1979. Resume of Papers.
1979, 56p
Prepared in cooperation with Bombay Textile Research Association and South India Textile Research Association.

Contents:
Inter-firm comparision of financial performance an inter-laboratory project by ATIRA, BTRA & SITRA;
Energy audit in ring frames;
Role of cotton, carding conditions and spinning systems in yarn properties and spinning performance;
Comparative performance of conventional and high speed drawframes;
Effect of apply frictionizers at various stages of processing on yarn properties;
Increasing production on ring frames working on staple fibers and coarse cotton counts;
In frequent yarn faults;
A survey of the quality of knitting yarns;
Possibility of adopting open-end system for yarn production in decentralized sector;
Reduction in pilling tendency of fabrics containing polyester;
Studies on asymetric shedding;
Some studies in squeeze load during sizing;
Independent estimates of cotton fiber fineness and maturity using ATIRA fiber fineness tester;
An optical scanning method for quick and accurate determination of fiber fineness;
Irregularity of blended fiber assemblies;
Practical application of variance length curve analysis;
Application of scanning electron microscopy in textile research;
Mathematical representations of interlacements (II) application computer graphics;
Investigation on the chemical processing of cotton/man-made cellulosic fiber blends and its effects on fabric properties;
and The role of fibre structure in the wear life of durable press dress materials;
Role of bleaching agents on strength-abrasion retention of DMEU finished poplin fabric;

and Radiation induced cross-linking of cellulose with formaldehyde and dimethylol dihydroxy ethylene urea (DMDHEU).

PB81-214751 PC **A07**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Technological Conference (21st), February 14-15, 1980. Resume of Papers.
1980, 132p
Prepared in cooperation with Bombay Textile Research Association and South India Textile Research Association.

Contents:
- Spinning;
- Weaving;
- Chemical processing;
- Textile physics;
- Fabric science;
- Operations studies.

PB81-215030 PC **A03**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
How Many Machines per Operatives. Part I. General Principles of Allocation.
Monograph rept.,
V. N. Patankar, D. V. N. Sarma, and T. A. Subramaniam. Feb 56, 30p
See also Part 2, PB81-215048.

Contents:
- Machine efficiency and operative efficiency;
- Machine interference;
- Effect of machine interference on machine and operative efficiencies;
- Ancilliary work and its effects on machine and operative efficiencies;
- How many machines per operative;
- Problems of implementation;
- Wage structure.

PB81-215048 PC **A03**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
How Many Machines per Operative. Part II. Predicting Machine and Operative Efficiencies.
Monograph rept.,
V. N. Patankar, D. V. N. Sarma, and T. A. Subramaniam. Feb 56, 43p
See also Part 1, PB81-215030.

Contents:
- Some definition;
- A fundamental relation between machine efficiency and operative efficiency;
- Types of stoppages and ancillary work;
- Predicting machine and operative efficiencies when machines are subject to systematic stoppages and the operative is always available for productive work;
- Predicting machine and operative efficiencies when machines are subject to random stoppages and the operative is always available;
- Predicting machine and operative efficiencies when machines are subject to random stoppages and the operative has ancillary work;
- An application.

PB81-216202 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
The Effect of Reed Quality and Constructional Variables of Fabric on Streakiness.
Research note.
Mar 74, 15p MP-61

With a view to select reeds for weaving different fabrics, the nature of dependence of fabric streakiness on uneven dent spacing of reeds has been studied exhaustively. Ratings of Moire patterns of a large number of reeds and the fabrics wovendyed and finished-from these reeds show that fabric streakiness increases linearly with unevenness in dent spacing of reeds. For medium and heavy fabrics, an increase in cloth cover factor accompanied by an increase in warp cover factor reduces fabric streaks. Lighter fabrics in which the warp cover factor is below 12 do not show such a trend. Changes in weft cover factor in the range studied-9 to 14-do not influence fabric streakiness. For any given quality of reeds and warp cover factor, the fabric streakiness is higher for the drawing order of 4 ends per dent than that for 2 and 3 ends per dent. Between 2 and 3 ends per dent, the difference in the appearance of streaks is small.

PB81-216210 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Unevenness in Carded Yarns: The Presence of Periodic and Quasi-Periodic Waves.
Research note.
May 75, 20p MP-69

Contents:
- The present study (Selection of the sample, Testing procedure, and Method of analysis);
- Results and discussion (Strict periodic waves, Quasi-periodic waves, and Other wavelength);
- Conclusions.

PB81-216228 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Washing of Textiles.
Circular rept.
Oct 72, 25p ENG-55

In the wet processing department of textile mills, the fabric undergoes various types of chemical treatments. After the treatment, the residual chemicals and other loose impurities in the fabric are to be removed which is done by washing. The fabric is washed either in rope form or in open width form. The washing machine usually incorporates two arrangements, squeeze arrangement to extract impure liquor from fabric and a wash water tank for dilution of fabric impurity. These two arrangements play important role in the washing mechanism. Details of the washing mechanism, their theoretical analysis and their practical application to various types of machines in order to understand the washing process, to improve washing performance and to reduce water consumption are presented in this report.

PB81-216921 PC **A03**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Some Common Fabric Defects at Grey Stage.
Monograph rept.
Mar 73, 34p MP-58

Contents:
- Warp streaks, Reediness in cloth, Irregular reppiness, Phurkies, Curled and folded selvedges, Weft snarls, Weft bars, Broken picks, Lashing-in, Some well known defects, and Suggested reading for further details on some of the important fabric defects.

PB81-217507 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Use of Indian Cottons in Polyester-Cotton Blends.
Rept. no. 1.
c1973, 9p

The production of polyester fibers in India will increase manifold in the very near future. It is to be expected that the bulk of this will be consumed in blends with cotton and viscose. There will, therefore, be a considerable increase in the demand for cotton that is suitable for blending with polyester fibers. If only imported cottons are to be considered for these blends, the demand cannot be met. Suitable Indian cottons will, therefore, have to be used as substitutes for these cottons. In making the choice of suitable Indian cottons, test data on blend yarns using Indian cottons would be required. ATIRA has, therefore, decided to issue to its member mills a series of reports giving such data as well as information on the processing conditions used. The series will cover a number of yarns spun using different Indian cottons, in varying blend proportions with polyester fibers of different lengths and deniers. It should be pointed out that in these spinnings the Indian cottons will be carded using the processing parameters that would normally be used for carding cottons for superfine spinning. This procedure is being followed because earlier experiments in ATIRA have shown that 'super carding' is a good means of upgrading Indian cottons. It is, therefore, expected that super carding will enhance the suitability of Indian cottons for use in blends with polyester fibers. This is the first report of the series, and gives data on 40s and 60s yarns spun from Shankar-4 and ISC-67 cottons blended individually with polyester fibers of 38 mm and 1.2 denier. (Copyright (c) 1973.)

PB81-217515 PC **A02**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Use of Indian Cottons in Polyester-Cotton Blends.
Rept. no. 2,
c1973, 10p

The production of polyester fibers in India will increase manifold in the very near future. It is to be expected that the bulk of this will be consumed in blends with cotton and viscose. The series will cover a number of yarns spun using different Indian cottons, in varying blend proportions with polyester fibers of different lengths and deniers. This report, the second in the series, gives data on 32s, 40s and 50s yarns spun from Sankar-4, Digvijay and CO2 cottons blended individually with polyester fibers of 32mm and 2.2 denier. The most commonly used fiber length for polyester fibers in India at present is 38 mm, but this is generally blended with imported cottons with effective length 36 mm to 38 mm. As Indian cottons are of shorter length, a shorter staple polyester fiber was thought to be more compatible, and therefore 32 mm fibers have been used. The use of 32 mm fibers could also be expected to result in fewer crackers in bulk spinning with short cradles which are available in practically all the mills. (Copyright (c) 1973.)

11F. Metallurgy and Metallography

AD-A100 642/8 PC **A15**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Crack Growth Behavior of Alloy IN-100 under Sustained Load at 732 C (1350 F).
Final rept. Jul 77-Jun 80,
Robert C. Donath. Apr 81, 343p Rept no. AFWAL-TR-80-4131

Sustained load crack growth in IN-100 at 1350 F (732 C) is studied using two specimen geometries, a standard compact tension specimen and a radially cracked ring loaded in tension. The effects of specimen thickness on the growth rate are investigated covering a range from 0.22 inch (5.6mm) to 0.72 inch (18.3mm) in thickness. Only the thinnest specimens show a crack growth rate which is lower than that obtained from all of the other thickness specimens. Stress intensity factor, net section stress, load line displacement rate, and the C*-integral are investigated as possible crack growth rate correlating parameters. In addition, a crack driving force function, G, is developed for a linear elastic creeping solid which represents the excess of energy available for creating new crack surfaces. In particular, the crack growth rate is observed to decrease from an initially higher value to a 'steady state' rate which depends on the stress intensity factor, net section stress or load line displacement rate. In the correlation of the stress intensity factor, the magnitude of this initial growth rate is about double the 'steady state': creep crack growth rate. The concept of an effective crack length determined from specimen compliance measurements is introduced as a measure of crack length for severely tunneled crack front geometries. Neither net section stress, load line displacement rate nor C* are found to be acceptable as crack growth parameters based on data from both test geometries. Although the stress intensity factor, K, provides fair correlation, the phenomenology of creep crack growth prevents its description adequately with only a single parameter. (Author)

AD-A100 694/9 PC **A08**/MF **A01**
United States Steel Corp., Monroeville, PA. Research Lab.
Effect of Volume Fraction and Shape of Sulfide Inclusions on Through-Thickness Ductility and Impact Energy of High-Strenght 4340 Plate Steels. Section I. Part I. Axisymmetric and Plane-strain Tensile Ductility. Part II. Impact Energy and Transition Temperature.
Final rept. 1 Jan 78-28 Feb 81,
G. R. Speich, W. A. Spitzig, R. E. Smelser, O. Richmond, and E. J. Appleby. 30 Apr 81, 156p
76-H-044(091)-SECT-1, ARO-14122.1-MS
Contract DAAG29-78-C-0008
Includes Rept. no. 76-H-044(091)-SECT-2 dated 30 Apr 81.

For many years it has been a goal of the materials scientist to quantitatively link the microstructures of steels to their gross mechanical properties. Because of the very complex structures of steels this goal has been very difficult to achieve. Yet it is believed that average, or otherwise characteristic, features of microstructure are related to overall mechanical properties in a well-defined and quantitative manner. Suitable models of structure together with the capabilities of computer programs which accurately model elastoplastic behavior offer new hope for predicting gross mechanical properties from a knowledge of microstructure. The approach taken in this paper is to represent the structure of a particular steel by a characteristic microcell. The deformation behavior of the microcell is then investigated with large-strain elastoplastic finite-element analysis and related to overall mechanical properties. Quantitative results for the elongation and microcells containing voids of different volume fractions and shapes have been determined. These include graphic descriptions of the growth of voids and the spread and eventual localization of plastic zones of deformation. Although some problems related to numerical stability of the solutions and detection of localized plastic flow remain, the preliminary results are encouraging. Specific recommendations for future work are made. (Author)

AD-A100 771/5 PC **A02**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Materials Science.
An Experimental Investigation of the Melting Behavior of Small Metal Particles.
Final rept. 1 Jun 77-31 Dec 80,
W. A. Jesser. 1 Jun 81, 18p UVA/525111/MS81/101, ARO-14519.2-MS
Contract DAAG29-79-C-0115, Grant DAAG29-77-G-0156

A dark-field transmission electron microscope technique was applied to a collection of submicron sized metal crystallites prepared by in-situ physical vapor deposition onto an amorphous carbon substrate in a vacuum of 2 x 10 to the -7th power torr in order to determine the melting behavior of individual crystallines. It was found that each particle melted suddenly at a single temperature which decreased with decreasing size. No liquid sheath was observed at any time. The melting temperature seemed to decrease nearly linearly with increasing surface curvature. Flat platelets with a near zero surface curvature but a significant surface to volume ratio showed no noticible size dependence of melting temperature. Oxidation of the particles raised their melting temperature as did embedding the particles in an amorphous carbon matrix. A simple thermodynamic model can account for all of the above observed effects. (Author)

AD-A100 818/4 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Crystallization Kinetics of Two Metallic Glasses by Mossbauer Spectroscopy.
Master's thesis,
Denis Eugene Beller. 7 Mar 81, 77p Rept no. AFIT/GNE/PH/81M-1

In this study, Mossbauer spectroscopy was used to examine thermal aging of two metallic glasses. Fe80B20 was isothermally annealed at 573, 604, 611, and 626 K; and fe80P6.5C3.5B10 was annealed at 614, 716, and 744 K. The activation energy of Fe80B20, determined from the growth of alpha-Fe crystals, was 0.256 + 0.006 MJ/mole. The projected lifetime of this glass, based on the onset of crystallization, is 400 years. No quantitative data were obtained for Fe80P6.5C3.5B10; however, based on the higher temperature required for crystallization, it is expected to have a longer lifetime. (Author)

AD-A100 828/3 PC **A05**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Materials Engineering.
The Effect of High Pressure on Phase Relationships and Some Properties of Ti and Its alloys.
Final technical rept. Sep 78-Jan 81,
A. Rabinkin, and E. Gutmanas. May 81, 79p
Grant DA-ERO-78-G-112

This report summarizes research on phase transformations induced by the application of high pressure in Ti, Ti-Mo and Ti-V alloys. The relationship of microstructure, studied by TEM and quantitative X-ray diffraction analysis with mechanical properties and superconductive properties was found. The effect of alloying and pressurizing on phase stability correlates with changes in basic physical properties of phases. (Author)

AD-A100 910/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Liquidus Isotherms, Solidus Lines and LPE Growth in the Te-Rich Corner of the Hg-Cd-Te System.
Journal article,
Theodore C. Harman. 12 Jun 80, 18p JA-5132, ESD-TR-81-96
Contract F19628-80-C-0002
Pub. in Jnl. of Electronic Materials, v9 n6 p945-961 1980.

No abstract available.

AD-A101 034/7 PC **A03**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
Directory of Organizations, Investigators, Sponsors, and Programs in Rapid Solidification Technology.
Final rept.,
Thomas F. Kearns. May 81, 46p IDA-P-1584, IDA/HQ-81-23533, AD-E500 338
Contract MDA903-79-C-0202

The Institute for Defense Analyses (IDA) was asked by the Defense Advanced Research Projects Agency (DARPA) to make an assessment of rapid solidification technology (RST) and its Department of Defense applications. In doing so, it was appropriate to identify the organizations, investigators, sponsors and programs active in the field in the United States and Canada. Emphasis in the IDA assessment is on materials of construction rather than on electrical or magnetic materials. The Directory lists 115 organizations active in the field with addresses, names, and telephone numbers of about 250 investigators, and 21 sponsoring organizations. It includes also a listing of topics being studied by the various organizations.

AD-A101 087/5 PC **A02**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Multilayer Diffusional Growth in Silver-Zinc Alloys.
Technical rept.,
John P. Hirth. 12 May 80, 17p Rept no. TR-21
Contract N00014-75-C-0541
Pub. in Metallurgical Transactions A, V12A p639-652 Apr 81.

No abstract available.

AD-A101 173/3 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Mfg. and Productivity.
The Effects of Ion Implantation on Friction and Wear of Metals.
Progress rept. Jan 80-Apr 81,
Nam P. Suh, and Sharon R. Shepard. May 81, 185p
Contract N00014-80-C-0255

The effect of ion implantation on the friction and wear behavior of metals was investigated. Experiments were conducted with iron, titanium, and copper implanted with nitrogen ions, iron implanted with aluminum ions, and copper implanted with zinc ions. The significant reduction in friction and wear of the iron and titanium systems is attributed to a hard layer formed during the ion implantation process. This hard layer minimizes plowing and subsurface deformation and hence reduces the delamination wear process, i.e. crack nucleation, crack propagation, and the formation of delamination wear sheets. A finite element model of an elastic semi-infinite solid under the contact of a stationary rigid asperity showed that the hard layer does not change the subsurface stress distribution by supporting the load, but rather that this thin layer decreases the plowing component of friction. The model predicts that this decrease in the friction coefficient in turn, substantially reduces subsurface deformation and thus wear. The implanted copper specimens which did not appear to have a hard surface layer showed little improvement in their tribological behavior over the unimplanted copper.

AD-A950 640/3 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park. Coll. of Mineral Industries.
Cooperative Research with Watertown Arsenal on Fracture Characteristics of Metal.
Final rept.,
E. J. Teichert, J. R. Low, Jr., K. J. Stodden, and H. J. Weymer. 15 Oct 47, 72p WA-310/75-5
Contract W-19-066-ORD-1119

No abstract available.

AD-A950 684/1 MF **A01**
Watertown Arsenal Labs., MA.
Method for Evaluating and Expressing the Toughness of Steel.
Memorandum rept.,
S. A. Herres, and A. F. Jones. 9 Sep 46, 24p
Rept no. WAL-310/71
Availability: Microfiche copies only.

No abstract available.

DE81023066 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Internal Oxidation and Sulfidation of Iron-Based Binary Alloys.
P. J. Risse. May 81, 79p LBL-12785
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

This project looks at internal oxidation and sulfidation, as one aspect of the coal gasification corrosion problem. By using different gas mixtures of H sub 2 S/H sub 2 O/H sub 2 /Ar the activities of the oxidants (oxygen and sulfur) are controlled to the point that iron, in the iron based binary alloys (Fe-1% Al, 5% Al, 1% Cr, 5% Cr), appears as a noble metal. The oxidants then diffuse into the noble iron matrix and interact, via precipitation, with the less noble elements, which allows depth of penetration analysis and morphology characterization to be performed. In the latter analysis, continuous subscales were formed both at the relatively high P/sub S2/ and at a low P/sub O2/, leaving a narrow range of potentials where the theories of Wagner are applied. The depth of penetration analysis yielded permeabilities (solubility-diffusivity) and effective diffusivity coefficients for the oxidants. 28 figures, 6 tables. (ERA citation 06:023034)

DE81023403 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Micromechanical Modeling of Microstructural Damage in Creeping Alloys. Progress Report, April 1, 1980-March 31, 1981.
A. S. Argon, and F. A. McClintock. 3 Apr 81, 58p
DOE/ER/04461-T1
Contract AS02-77ER04461
Microfiche only after original copies are exhausted.

The research on Micro-Mechanical Modeling of Microstructural Damage and Crack Growth in Creeping Alloys has made good progress in both theoretical and experimental studies in most of the areas proposed in last year's renewal proposal. This progress is described in the order of microprocesses to macro-stress analyses, and theoretical studies preceding experimental studies. (ERA citation 06:023903)

DE81023568 PC **A02**/MF **A01**
Argonne National Lab., IL.
Void Strengthening.
R. O. Scattergood, and D. J. Bacon. 1980, 7p
CONF-800696-2
Contract W-31-109-ENG-38
International conference on dislocation modeling of physical systems, Gainesville, FL, USA, 22 Jun 1980.
Microfiche only after original copies are exhausted.

A representative example of strengthening mechanism calculations is given. The critical stress necessary for a dislocation to cut through a row of equi-spaced voids was determined using anisotropic elasticity and the complete dislocation self force. The void-dislocation boundary conditions were treated by an approximate method. Based on the results, a simple correlation describing the critical stress was developed, and elastic anisotropy was included by means of effective values for the shear modulus and Poisson ratio. Dislocation self interaction is manifest as a critical line-tension cusp angle and a logarithmic cutoff parameter for the line energy. Voids are strong obstacles to dislocation motion, with critical stress values about 70% or more of the Orowan stress. (ERA citation 06:023893)

DE81023739 PC **A03**/MF **A01**
Ames Lab., IA.
Alloy Evaluation for Fossil-Fuel Process Plants (Liquefaction). Quarterly Report, 1 October 1980-31 December 1980.
C. M. Woods, and T. E. Scott. 15 Jan 81, 28p IS-4763
Contract W-7405-ENG-82
Microfiche only after original copies are exhausted.

Objective was to evaluate 2 1/4 Cr-1 Mo steel in a dissolver environment. This material was subjected to hydrogen attack tests at 900 to 1000 exp 0 F and to fracture mechanics tests during this quarter. Notch tensile strength and reduction area were measured after exposure. Fatigue crack growth rates were measured in argon and in 1000-4000 psig hydrogen. 7 figures. (ERA citation 06:023907)

DE81024148 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Corrosion of High Temperature Materials in AFBC Environments. Part 1 (1500-H Tests).
R. H. Cooper, T. G. Godfrey, and J. H. DeVan.
Jun 81, 39p ORNL/TM-7734/P1
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

Candidate heat exchanger tube materials have been tested for times to 1500 h in a small-scale atmospheric fluidized-bed combustor (AFBC) operated by the FluiDyne Corporation of Minneapolis, Minnesota. The materials included alloys 800H and 600; types 304, 310, and 316 stainless steel; and aluminized alloy 800 and type 310 stainless steel. These air-cooled tubes were exposed to the AFBC environment with wall temperatures ranging from 810 to 875 exp 0 C, a Ca/S molar ratio of 3.3 to 5.3, 2.5 to 3.5% excess O sub 2 , and a fluidizing velocity of 0.7 m/s (2.3 fps). Tubes were removed for examination after 500 h of exposure and at the conclusion of the 1500-h test. In general, the materials performed well with moderate fireside scale formation and slight intergranular corrosion. The notabe exception was catastrophic corrosion of three alloy 600 tubes shortly after resumption of the test following the 500-h segment. (ERA citation 06:024060)

DE81024500 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Numerical and Experimental Study of the Ductile Failure of 7075-T651 Aluminum.
S. E. Benzley, M. S. Soo Hoo, and T. G. Priddy.
May 81, 51p SAND-80-1891
Contract AC04-76-DP00789
Microfiche only after original copies are exhausted.

A combined experimental/numerical analysis has been performed on the nonlinear response and ductile failure of 7075-T651 aluminum. The different specimen shapes which were tested and analyzed produced: (1) pure shear; (2) uniaxial; (3) biaxial; and (4) triaxial states of stress in an axisymmetric geometry. Experiments performed on these specimens were subsequently analyzed with large strain finite element calculations. The calculations closely modelled experimental behavior. The calculated stresses and strains were then used to study ductile multiaxial failure criteria for monotonic loading configurations. This study concludes that the strain at which 7075-T651 aluminum fails is dependent upon the existing triaxial stress field, the higher the triaxiality, the smaller the effective plastic strain at failure. The relationship between strain at failure and the degree of triaxiality is given by the failure criteria. (ERA citation 06:023913)

DE81024906 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. W.M. Keck Lab. of Engineering Materials.
X-Ray Diffraction Studies of the Structure of La-Al-Ga Alloys.
A. Williams. Nov 80, 24p CALT-822-121
Contract AC03-76ER00822
Microfiche only after original copies are exhausted.

The La-La and La-Al partial atomic pair distribution functions have been determined for glassy La/sub 1-x/Al/sub x/ alloys from x-ray diffraction studies of isomorphous alloys of La/sub 1-x/Al/sub x/, La/sub 1-x/(AlGa)/sub x/, and La/sub 1-x/Ga/sub x/ for x = 0.20, 0.24, and 0.28. The atomic short range order of these La based metallic glasses is quite different from that of typical amorphous transition metal-metalloid alloys and from dense random packing models. A relatively short and well defined La-Al nearest neighbor distance suggests some covalency in the bonds between unlike atoms and possible chemical ordering in the alloys. (ERA citation 06:023892)

DOE/ET/52039-T1 PC **A02**/MF **A01**
McDonnell Douglas Astronautics Co., St. Louis, MO.
Summary of Titanium Studies in Support of Fusion Energy.
J. W. Davis. May 80, 13p COO-4247-3
Contract AS02-77ET52039
Portions of document are illegible.

High-energy neutron irradiation of Ti-6A1-4V results in extensive defect clusters, prismatic loops along with fine, ellipsoidal, 10 to 20 nm beta precipitates with orientation relationships)0001)/sub alpha / parallel)110)/sub beta / and <1120>/ sub alpha / parallel <111>/sub beta /. The beta precipitates redissolve upon annealing the irradiated alloy at 650 exp 0 C. The causes of beta precipitation were identified to be radiation-enhanced diffusion and radiation-induced segregation of the undersized beta stabilizing element, vanadium, to the defect clusters. The radiation-induced defect structure in the near-alpha alloys consists of a high density of defect clusters, a/3<1120> prismatic dislocation loops, and c-component dislocations and vacancy loops with no indication of beta precipitation. The increase in hardness as a result of irradiation is greater in Ti-6Al-4V than in the near-alpha alloys because of the precipitation strengthening by radiation-induced, fine, beta precipitates. The radiation damage of the alloys anneals out completely at 650 to 750 exp 0 C. (ERA citation 06:023906)

LBL-12614 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Oxidation Mechanisms for Alloys in Single-Oxidant Gases.
D. P. Whittle. Mar 81, 45p CONF-810347-2
Contract W-7405-ENG-48
NACE international conference on high temperature corrosion, San Diego, CA, USA, 2 Mar 1981.

Scales formed on alloys invariably contain the alloy constituents in a ratio different from that in the alloy, owing to the differing thermodynamic tendencies of the alloy components to react with the oxidant and to differences in diffusion rates in scale and alloy phases. This complex interrelationship between transport rates and the thermodynamics of the alloy-oxidant system can be analyzed using multicomponent diffusion theory when transport-controlled growth of single or multi-layered scales occurs. In particular, the superimposition of the diffusion data on an isothermal section of the appropriate phase diagram indicates the likely morphologies of the reaction products, including the sequence of phases found in the scale, the occurrence of internal oxidation and the development of an irregular metal/scale interface. The scale morphologies on alloys are also time-dependent: there is an initial transient stage, a steady state period, and a final breakdown, the latter often related to mechanical influences such as scale adherence, spallation, thermal or mechanical stresses and void formation. Mechanical influences have a more devastating effect in alloy oxidation due to the changes in alloy surface composition during the steady state period. (ERA citation 06:023911)

N81-26234/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
High Temperature Cyclic Oxidation Furnace Testing at NASA Lewis Research Center.
C. A. Barrett, and C. E. Lowell. 1981, 15p NASA-TM-81773, E833
Presented at the Symp. On Ind. Methods for Testing at High Temp. Environ., Phoenix, Ariz., 12 May 1981; Sponsored by American Society for Testing and Materials.

A standardized method of testing the cyclic oxidation resistance of various alloys in static air to 1200 C was developed and is routinely used at NASA Lewis Research Center. Test samples are automatically raised and lowered into a resistance wound furnace for a series of fixed interval heating and cooling cycles. Spall catchers collect the accumulated spall from each sample. The samples are weighed intermittently to generate specific weight change/time data. At various test times the samples and the accumulated spall are analyzed by X-ray diffraction. A computer program uses this gravimetric and X-ray data as input to print out the oxidation curves and specific weight change/time and X-ray results in a published format, organizes, and indexes the data. So far, several hundred Fe, Ni, and Co base alloys were tested using this same basic procedure and results form the basis of a series of cyclic oxidation handbooks to be published by NASA. Such specific weight change/time data were used to estimate the oxidative metal consumption by several computer modeling techniques to rank alloys and for use in life testing estimates.

N81-26235/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Fretting Wear and Fretting Fatigue: How Are They Related.
R. C. Bill. 1981, 25p NASA-TM-82633, AVRADCOM-TR-81-C-16
Prepared in Cooperation with Army Aviation Research and Development Command, Cleveland, Ohio. Proposed for Presentation at the Joint Lubrication Conf., New Orleans, 4-7 Oct. 1981; Sponsored by American Society of Lubrication Engineer and Asme.

Results from published literature, and results obtained experimentally using a fretting wear apparatus are examined to determine how fretting wear and fretting fatigue are related. The effects of various experimental parameters including slip amplitude, number of fretting cycles, frequency of fretting motion, experimental atmosphere, temperature, and the performance of coatings and surface treatments are surveyed. All of the results examined indicate that fretting wear and fretting fatigue are influenced in a consistent and analogous manner by controlled variations in experimental conditions. That is, conditions that tend to accelerate fretting wear also accelerate fretting fatigue failures. Correlation of the performance of coatings on material under fretting wear and fretting fatigue conditions is rather tenuous, partly because similar contact conditions for fretting fatigue and fretting wear are not available for very many materials.

ORNL-tr-4744 PC **A02**/MF **A01**
New Method of Preparation of Rare Earth Metals Carbothermal Reduction of Their Oxides.
G. Male. 1977, 23p
Contract W-7405-EN-26
A, Rev. Int. Hautes Temp. Refract. 14 P179-192 1977.

The study of the reduction of lanthanum sesquioxide (cerium group) and erbium sesquioxide (yttrium group) has been made versus the pressure of

carbon monoxide. It has shown the existence of two equilibrium reactions in the case of lanthanum, and of only one reaction for erbium. The relationship of equilibrium pressures to the temperature permitted the calculation of thermodynamic values of resulting carbides and oxicarbides. The lanthanum, neodymium, gadolinium, dysprosium, erbium and yttrium dicarbides were prepared by carbothermic reduction of the sesquioxides in solid state. Conditions for obtaining products containing very little oxygen were determined. The melting of these fritted carbides in the solar furnace decreases considerably both their amount of oxygen and their hydrolysability. This treatment improves also their homogeneity. (ERA citation 06:023926)

PB81-214843 PC **A05**/MF **A01**
Bend Research, Inc., OR.
Coupled Transport Membranes for Metal Separations.
Final rept. on phase 4, May 78-Jul 79,
W. C. Babcock, R. W. Baker, D. J. Kelly, E. D. LaChapelle, and H. K. Lonsdale. Aug 79, 98p
BuMines-OFR-67-81
See also PB-293 029.

This report presents the results of continuing innovative technology research to use coupled transport membranes to separate metals in solution, namely vanadium and uranium. The development of new hollow fiber membranes is described. Bench-scale tests demonstrated the clean separation of uranium from vanadium and iron. Future work will involve testing the membranes under actual field conditions.

PB81-215501 PC **A05**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Laser-Initiated Combustion Studies of Selected Aluminum, Copper, Iron, and Nickel Alloys,
James W. Bransford, and Alan F. Clark. Apr 81, 90p NBSIR-81-1647
Contract NASA Order-H-43201B

The results of combustion studies at atmospheric pressure on ten metal alloys are presented. The alloys studied were aluminum alloys 1100, 2219, 6061, and tensile-50; 304, 347 and 21-6-9 stainless steel; inconel 600; beryllium-copper and a bronze. It was found that once ignition was achieved all alloys would generally burn to completion. The overall combustion process appears to obey a first-order rate process. Preliminary conclusions are presented along with recommendations for future work.

PB81-215766 Not available NTIS
National Bureau of Standards, Washington, DC.
Sliding Wear Behavior of Electron Beam Surface Melted 0-2 Tool Steel.
Final rept.,
A. W. Ruff, and L. K. Ives. 1981, 9p
Proceedings of Int. Conf. Wear of Materials (3rd), held at San Francisco, CA. on March 30-April 2, 1981.
Pub. in the American Society of Mechanical Engineers, p326-34 1981.

Studies were carried out on the dry sliding wear behavior of electron beam melted surface layers on a type 0-2 tool steel, and on annealed and conventionally hardened 0-2 steel specimens for comparison. Wear tests were conducted in a flowing argon atmosphere at a sliding speed of 20 cm/s, a load of 10 N, and against a 52100 bearing steel ring. Wear surface morphology was studied along with subsurface structure using optical and electron microscopy methods. The study concentrated on the wear of this steel after different processing treatments.

PB81-216756 Not available NTIS
National Bureau of Standards, Washington, DC.
Effect of Gravity on Coupled Convective and Interfacial Instabilities during Directional Solidification.
Final rept.,
S. R. Coriell, M. R. Cordes, W. J. Boettinger, and R. F. Sekerka. 1981, 7p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC. Proceedings of the COSPAR Plenary Meeting (23rd) held at Budapest, Hungary on June 2-14, 1980.
Paper in Advanced Space Research 1, p5-11 1981.

The authors investigate the role of gravity in a linear stability analysis of the onset of coupled convective and morphoiogical instabilities during directional solidification at constant velocity of a dilute alloy of tin in lead.

PB81-807141 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superalloys. 1977-April, 1981 (Citations from the NTIS Data Base).
Rept. for 1977-Apr 81.
Jul 81, 231p
Supersedes PB80-805831, and NTIS/PS-79/0220. See also 1964-1976, NTIS/PS-78/0198.

Federally-funded research on cobalt- and nickel-based superalloys is cited. Casting and powder metallurgy of these alloys are covered. Properties such as heat resistance, corrosion resistance, microstructure, fracture, and creep are described. The use of these materials in nuclear reactors, gas turbine parts, and high temperature equipment is a major part of this compilation. (This updated bibliography contains 225 citations, 60 of which are new entries to the previous edition.)

PB81-807158 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superalloys. 1979-March, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1979-Mar 81.
Jul 81, 247p
Supersedes PB80-805856, and NTIS/PS-79/0221. See also 1970-1973, NTIS/PS-76/0107, 1974-March, 1977, NTIS/PS-78/0200, 1977-1978, PB80-805849.

Worldwide research is cited on cobalt-, iron-, and nickel-based superalloys. The manufacture, melting, casting, powder metallurgy, forging, and welding of these alloys are covered. Studies on corrosion, high and low temperature properties, physical, and mechanical properties of these materials are included. Applications discussed include nuclear reactors, gas turbines, superconducting machinery, and heat exchangers. (This updated bibliography contains 242 citations, 110 of which are new entries to the previous edition.)

PB81-861544 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metals Recovery from Wastes. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 40p

This retrospective bibliography contains citations concerning the recovery and recycling or reuse of ferrous and nonferrous metals from various industrial wastes, especially waste waters. (Contains 49 citations fully indexed and including a title list.)

PB81-861718 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mechanical and Metallurgical Properties of Aluminum-Nickel Alloys. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 68p

The mechanical, metallurgical, and thermodynamic properties of aluminum-nickel alloys are covered. Special emphasis is placed on directional solidification and various methods of hardening. The structure and strength of the alloys are discussed in terms of solidification methods. (Contains 82 citations fully indexed and including a title list.)

PB81-871014 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lead Smelting: Foundry Practice and Environmental Aspects. January, 1966-June, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jun 81.
Jul 81, 61p

The blast furnace smelting of lead ore and scrap is covered. Secondary smelting of lead from electric batteries is emphasized. Advances in lead ore extraction are included, as well as environmental aspects of the smelting process. (Contains 84 citations fully indexed and including a title list.)

PB81-872202 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Tensile Properties and Machinability of Leaded Brasses. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 61p

The machinability and tensile properties of leaded brasses are discussed. Emphasis is placed on the plastic properties and the workability of this class of alloys which lends itself to continuous casting and extrusion processes. (Contains 92 citations fully indexed and including a title list.)

PB81-872343 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Leaded Steels: Machinability and Tensile Properties. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 65p

The machinability of leaded steels is discussed in terms of tensile properties. The effects of impurities and inclusions on the microstructure of the alloys are included. The continuous casting process and ladle refining are also considered. (Contains 88 citations fully indexed and including a title list.)

PB81-872491 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Desulfurization of Steels by Addition of Calcium or Rare Earth Elements. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 96p

The desulfurization of steels by adding reactive metals or calcium compounds is considered. The process takes place by means of addition to the ladle. The use of rare earth elements for the control of non-metallic inclusions is also included. (Contains 130 citations fully indexed and including a title list.)

UCRL-Trans-11676 PC **A02**/MF **A01**
Galvanic Deposition of Superinvar Alloys.
W. Alberth, A. F. Bogenshutz, J. L. Jostan, and A. Von Krusenstjern. 1975, 19p
Contract W-7405-ENG-48
A, Galvanotechnik, 66 n4 P291-300 1975.

The described galvanic method for depositing cylindrical superinvar hollow bodies is based on the use of a chloride-containing sulfate electrolyte and uses soluble iron, nickel and cobalt anodes, with a cathode current density of 10 A/dm exp 2 . The metal content of the electrolyte is about 100 g/l, the working temperature is 55 exp 0 C and the deposition rate is about 2.5 mu m/min. The chemical composition of the ternary alloys was varied in the range 66 to 76 wt % Fe, 24 to 30 wt % Ni and 0 to 6 wt % Co and included the desired superinvar alloy having 65 wt % Fe, 30 wt % Ni and 0 to 6 wt % Co, which is characterized by a very low linear expansion coefficient. For the galvanically produced alloy with 66.4 wt % Fe, 29 wt % Ni and 4.6 wt % Co, this value is < 2.87.10 exp -6 / exp 0 C after a thermal treatment and quenching treatment (in a temperature range 0 to 100 exp 0 C). Therefore, it is at least smaller by a factor of 1.3 than for binary invar alloys which were deposited galvanically. In both cases, due to electrocrystallization, we did not achieve the low expansion coefficients exactly as are known from invar and superinvar alloys produced by metallurgical melting. (ERA citation 06:022293)

UCRL-84957 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Additive Erosion Reduction Influences in the Turbulent Boundary Layer.
A. C. Buckingham. 6 May 81, 18p CONF-810549-1
Contract W-7405-ENG-48
Jannaf propulsion meeting, New Orleans, LA, USA, 26 May 1981.

Results of a sequence of flow, heat and mass transfer calculations are presented which theoretically characterize the erosive environment at the wall surface of refractory metal coated and uncoated gun barrels. The theoretical results include analysis of the wall surface temperature, heat flux, and shear stress time histories on thin (10 mil. or 0.254 mm) Cr, Mo, Nb, and Ta plated steel barrel walls as uncoated steel walls. The calculations combine effects of a number of separate processes which have been previously (and purposely) studied individually. These include solid particle additive concentrations, gas-wall thermo-chemical influences, and transient turbulent wall boundary layer flow with multi-component molecular diffusion and reactions from interaction of propellant combustion and the eroding surface. The boundary layer model includes particulate additive concentrations as well as propellant combustion products, considered for the present to be in the local thermochemical equilibrium. (ERA citation 06:023915)

11H. Oils, Lubricants, and Hydraulic Fluids

PB81-872178 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Temperature, High Wear Resistant Solid Lubricants. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 152p

The use of solid lubricants for high wear, high temperature resistant surfaces is discussed. Emphasis is placed on molybdenum disulfide; however, gold-molybdenum alloys and polysiloxanes are also discussed. Methods for depositing thin film solid lubricants include sputtering and electrodeposition. The corrosion properties of the solid lubricant-metal interface are also discussed. (Contains 153 citations fully indexed and including a title list.)

11I. Plastics

AD-A100 995/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
Studies of Conduction Mechanisms in Gas-Sensitive Polymer Films.
Final rept. 1 Jun 77-31 Aug 80,
Stephen D. Senturia. 1 Feb 81, 9p
Contract N00014-77-C-0361

The primary goal of this program was to understand the mechanisms of bulk and surface conduction in selected polymer films, and the effects of absorbed species on these conduction mechanisms. A second goal was to develop and exploit a novel technique for studying such conduction mechanisms based on a new microelectronic device called the charge-flow transistor. A third goal was generally to develop charge-flow transistor technology as a measurement technique for studying adsorbed species and for other applications. (Author)

N81-26461/6 PC **A16**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Mechanical Design Handbook for Elastomers.
Final Report.
M. Darlow, and E. Zorzi. Jun 81, 354p NASA-CR-3423, MTI-81TR5
Contract NAS3-21623

A comprehensive guide for the design of elastomer dampers for application in rotating machinery is presented. Theoretical discussions, a step by step procedure for the design of elastomer dampers, and detailed examples of actual elastomer damper applications are included. Dynamic and general physical properties of elastomers are discussed along with measurement techniques.

PAT-APPL-6-239 961 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Polyaromatic Esters.
Patent Application,
Paul Y. Chen. Filed 3 Mar 81, 20p AD-D008 529/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

New, easily processable, polyaromatic esters were prepared from 2,2'-diiododiphenyl-4,4'-dicarbonyl dichloride, isophthaloyl chloride and/or terephthaloyl chloride in combination with 4,4'-isopropylidene diphenol, 4,4'-sulfonyldiphenol, or resorcinol by interfacial condensation. In these polymers, phenylacetylenyl groups can be easily introduced into the polymer chain by replacing the iodine. This process leads to soluble and curable polymers from which films can be prepared. After curing the polymers are insoluble and show excellent thermal and chemical resistance. The curing process increases the polymers' softening temperature about 20 C. (Author)

PB81-215287 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Polymer Science and Standards Division.
Annual rept.,
R. K. Eby, M. G. Broadhurst, J. M. Cassel, B. M. Fanconi, and I. C. Sanchez. Apr 81, 91p NBSIR-81-2263

This publication outlines the organization and programs of the Polymer Science and Standards Division of the National Bureau of Standards. It contains summaries of all technical projects in the Division for the 1980 fiscal year.

PB81-224453 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
The Certification of the Limiting Viscosity Number of a Polystyrene Material by Solution Viscometry.
BCR reference material no. 88,
R. Fordham, W. Karcher, and L. J. Maisey.
c1980, 37p EUR-6966-EN
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The limiting viscosity number (LVN) (intrinsic viscosity) of a polystyrene material has been determined by solution viscometry in an exercise involving seven laboratories of the Member States of the European Communities and the Petten Establishment of the Joint Research Centre of the Commission of the European Communities. The certification procedure is described and experimental details of the inter-laboratory exercise are given. (Copyright (c) ECSC-EEC-Euratom, Brussels : Luxembourg, 1980.)

UCRL-52434(V.9) PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Development of Alternate Silicone Potting Compounds. Volume 9. Development of a New Compound Based on a Resin Having a Viscosity Range of 4.0 to 6.5 Pa.S.
W. E. Cady, and A. T. Buckner. 13 Mar 81, 12p
Contract W-7405-ENG-48

We formulated a new potting compound having an initial viscosity ranging from 3 to 4 Pa.s at 25 exp 0 C by accelerating Sylgard 184 (lot L84-89) with 6 parts of accelerator QCF3-6559 (lot PE-56). The blend has an initial viscosity of 3.3 Pa.s and a gel time of 93 min at 25 exp 0 C. The extractables content is less than 6.0 wt %. The blend is almost as thermally stable as Sylgard 184. (ERA citation 06:023942)

11J. Rubbers

AD-A101 093/3 PC **A03**/MF **A01**
Akron Univ., OH. Inst. of Polymer Science.
Effect of Size of Glass Filler on the Tensile Properties and Tear Strength of Polybutadiene.
Technical rept.,
Y. Eckstein, and P. Dreyfuss. 1 Jul 81, 40p Rept no. TR-13
Contract N00014-76-C-0408

An experimental study of the tensile properties, tear strength, hysteresis, and the swelling ratio of model composite elastomeric compounds consisting of polybutadiene filled with glass beads has been carried out as a function of the size of the beads. The diameter of the beads ranged from 25 to 1000 micrometer and the volume fractions examined were 0.16, 0.092 and 0.048. Mechanical properties of the filled elastomers were functions of the loading (separation distance), the particle size (surface area volume) and the elastomer-filler systems studied. (Author)

11L. Wood and Paper Products

PB81-219107 PC **A03**/MF **A01**
Alabama Univ., University. Bureau of Engineering Research.
Chemicals from Wood by Organic Solvent Delignification.
Interim rept.,
G. C. April, S. M. Hansen, J. Sheng, and R. Bharoocha. Apr 79, 44p BER-233-124, NSF/RA-790683
Contract NSF-AER78-02651

The study is directed at the advancement of the state-of-knowledge of organic solvent pulping technology and involves an evaluation of the technical and economic feasibility of proposed systems. Goals of the project are stated and conditions affecting the pulping of wood are discussed. Experimental results of current research include batch screening, solvent recovery, semicontinuous studies, and chemical analysis. Investigations deal with batch delignification studies of Southern Yellow Pine (soft wood) and Sweet Gum (hard wood) using aqueous n-butanol, ethanol, and phenol solutions at temperatures between 135-205 degrees C. Temperature, catalyst type and concentration, wood type, and treatment method are some of the variables investigated.

PB81-219115 PC **A04**/MF **A01**
Alabama Univ., University. Bureau of Engineering Research.
Chemicals from Wood by Organic Solvent Delignification.
Interim rept.,
G. C. April, S. M. Hansen, J. Sheng, and R. Bharoocha. Dec 79, 70p BER-246-124, NSF/RA-790684
Contract NSF-AER78-02651

The state-of-knowledge of organic pulping technology is examined. Investigations deal with batch delignification studies of Yellow Pine (soft wood) and Sweet Gum (hard wood) using aqueous n-butanol, ethanol, and phenol solutions at temperatures between 135-205 degrees C. Temperature, catalyst type and concentration, wood type, and treatment method are some of the variables considered. Semi-batch pulping methods and solvent selectivity are described. Calibration of the unit and appropriate analytical methods are evaluated for a detailed parametric investigation. Also reported is a kinetic analysis of batch and semi-batch results. Both delignification and pulp loss are interpreted using first order kinetics, and results generally agree with those previously reported.

PB81-872244 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Fabric Forming Used in Paper Processing. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 129p

Synthetic foming wires, wet felts, dry felts, and forming fabrics used in paper products processing are described in this bibliography from global literature. Items discussed include wire life, drainage, formation, power requirements, tension, and dimensional stability of synthetic wires, as well as machinery and equipment. (Contains 83 citations fully indexed and including a title list.)

12.

MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A100 590/9 PC **A02**/MF **A01**
Yale Univ., New Haven, CT. Systems and Information Sciences.
Stable Model Reference Adaptive Control in the Presence of Bounded Disturbances,
Gerhard kreisselmeier, and Kumpati S. Narendra.
Mar 81, 20p Rept no. S/IS-8103
Contract N00014-76-C-0017

The adaptive control of a linear time-invariant plant in the presence of bounded disturbances is considered. In addition to the usual assumptions made regarding the plant transfer function, it is also assumed that the high frequency gain (kp) of the plant and an upper bound on the magnitude of the controller parameters, are known. Under these conditions the adaptive controller suggested assures the boundedness of all signals in the overall system.

AD-A100 601/4 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Theory of Interval Iteration.
Technical summary rept.,
L. B. Rall. Mar 81, 14p Rept no. MRC-TSR-2196
Contract DAAG29-80-C-0041

A theory of interval iteration, based on a few simple assumptions, is given for the fixed point problem for operators in partially ordered topological spaces. A comparison of interval with ordinary iteration is made which shows that their properties are converse in a certain sense with respect to existence or nonexistence of fixed points. The theory of interval iteration is shown to hold without modification if the computation is restricted to a finite set of points, as in actual practice. In this latter case interval iteration is show to converge or diverge in a finite number of steps, for which an upper bound is given. By the introduction of a suitable iteration operator, the method of interval iteration is extended to the problem of solution of equations in linear spaces. (Author)

AD-A100 603/0 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On Optimal Harvesting with an Application to Age-Structured Populations.
Technical summary rept.,
Morton E. Gurtin, and Lea F. Murphy. Apr 81, 40p Rept no. MRC-TSR-2200
Contract DAAG29-80-C-0041, Grant NSF-MCS78-01935

This paper develops optimal harvesting policies for a population whose evolution is governed by a single autonomous nonlinear differential equation. The objective functional is not assumed to be convex. The results are used to discuss optimal policies for age-structured populations harvested with effort independent of age. (Author)

AD-A100 605/5 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Resonance through a Strictly Singular Perturbation.
Technical summary rept.,
Ketill Ingolfsson. Apr 81, 17p Rept no. MRC-TSR-2202
Contract DAAG29-80-C-0041

As a consequence of the formal difficulties in explaining resonances as solutions of the general Schroedinger equation, the procedure developed here exploits some fairly general properties of a semigroup, appropriate for the decay. A feature, which in this context may be named as 'the paradox of resonance', will be analyzed to some extent. By generalizing the time development one can, however, formulate the resonant state in a consistent way. Its definition will be interpreted along the lines of strictly singular perturbations. (Author)

AD-A100 606/3 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Andrews' Plots and Their Applications.
Technical summary rept.,
Agnes M. Herzberg. Apr 81, 11p Rept no. MRC-TSR-2203
Contract DAAG29-80-C-0041

A brief survey of several graphical multivariate techniques are given. Andrews' method is exploited as a graphical tool for the examination of changes over time in the parameters of a time series model. An example is given to illustrate the method. (Author)

AD-A100 607/1 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
An Extension to Rational Functions of a Theorem of J. L. Walsh on Differences of Interpolating Polynomials.
Technical summary rept.,
E. B. Saff, A. Sharma, and R. S. Varga. Apr 81, 32p Rept no. MRC-TSR-2204
Contract DAAG29-80-C-0041, Grant AFOSR-80-0226
Sponsored in part by Grants DE-AS02-76ERO-2075 and NSF80-0226.

In this paper, a theorem of J. L. Walsh, on differences of polynomials interpolating in the roots of unity and in the origin, is extended to differences of rational functions interpolating in more general sets. The original result of Walsh is described. Our generalization of Walsh's theorem is in two directions. First, we show that an analogous overconvergence holds for differences of rational interpolants to meromorphic functions F(z). Second, we show that the defining interpolation points can be considerably more general than the roots of unity and the origin. Finally, several concrete examples of our generalization are given, one consisting in applications of Faber polynomials.

AD-A100 608/9 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Numerical Solution of Boundary Value Problems on 'Long' Intervals.
Technical summary rept.,
Peter A. Markowich, and Christian A. Ringhofer. Apr 81, 40p Rept no. MRC-TSR-2205
Contract DAAG29-80-C-0041, Grant NSF-MCS79-27062

This paper deals with the numerical solution of boundary value problems of ordinary differential equations posed on infinite intervals. The solution of these problems proceeds in two steps. The first is to cut the infinite interval at a finite, large enough point and to insert additional, so called asymptotic boundary conditions at the far (right) end; the second is to solve the resulting two point boundary value problem by a numerical method, for example a difference scheme. In this paper the Box-scheme is investigated. Numerical problems arise, because standard algorithms use too many grid points as the length of the interval increases. An 'asymptotic' a priori mesh size sequence which increases exponentially, and which therefore only employs a reasonable number of meshpoints, is developed. Through investigating the conditioning of the (linearized) Box-scheme, we find that the solutions can be obtained safely by the Newton procedure when partial pivoting is employed.

AD-A100 609/7 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Convergence of Periodic Wavetrains in the Limit of Large Wavelength.
Technical summary rept.,
Jerry L. Bona. Apr 81, 18p Rept no. MRC-TSR-2206
Contract DAAG29-80-C-0041

The korteweg-de Vries equation was originally derived as a model for unidirectional propagation of water waves. This equation possesses a special class of traveling-wave solutions corresponding to surface solitary waves. It also has permanent-wave solutions which are periodic in space, the so-called cnoidal waves. A classical observation of Korteweg and de Vries was that the solitary wave is obtained as a certain limit of cnoidal wavetrains. This results is extended here, in the context of the Korteweg-de Vries equation. It is demonstrated that a general class of solutions of the Korteweg-de Vries equation is obtained as limiting forms of periodic solutions, as the period becomes large. (Author)

AD-A100 610/5 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Completeness of Derivatives of Squared Schroedinger Eigenfunctions and Explicit Solutions of the Linearized KdV Equation.
Technical summary rept.,
Robert L. Sachs. Apr 81, 23p Rept no. MRC-TSR-2207
Contract DAAG29-80-C-0041

Explicit solutions to the Cauchy problem for the linearized Kortweg-deVries (KdV) equation are constructed when the initial data is integrable. The method is analogous to the Fourier decomposition for a constant coefficient equation and uses the connection between the one-dimensional Schroedinger equation and the KdV equation, as discovered by Gardner, Greene, Kruskal, and Miura. An expansion theorem expressing any integrable function in terms of derivatives of squared Schroedinger (generalized) eigenfunctions is proved. These functions evolve according to the linearized KdV equation, hence the expansion of the initial data leads to a generalized solution of the linearized KdV equation. Under suitable restrictions on the initial data, the solution constructed is classical. The proof of the expansion theorem may be interpreted as the skew-adjoint analogue of the more familiar process of simultaneously diagonalizing two self-adjoint operators. (Author)

AD-A100 611/3 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Justification of the KdV Approximation to First Order in the Case of N-Soliton Water Waves in a Canal.
Technical summary rept.,
Robert L. Sachs. Apr 81, 50p Rept no. MRC-TSR-2208
Contract DAAG29-80-C-0041, Grant NSF-MCS77-01986

We consider the Euler equations for a perfect fluid in a flat-bottomed canal in the time-dependent case. A formal expansion procedure for small amplitude, long waves analogous to that of Friedrichs and Hyers for solitary waves is developed and leads to the Korteweg-de Vries equation (KdV for short) for the lowest order term. The higher order terms in the expansion satisfy the inhomogenous version of the linearized KdV equation. Of particular interest to us are those solutions of the KdV equation called N-solitons, which asymptotically separate into N travelling waves with distinct speeds. Using certain facts about the linearized

KdV equation and some properties of the N-solitons, we prove that the next term in this expansion can be uniquely specified by certain asymptotic conditions and a symmetry requirement. This solution behaves like an N-solition; asymptotically, it separates into N travelling waves with the same speeds and phases as those of the leading term. (Author)

AD-A100 612/1 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On the Existence of Positive Solutions of Semilinear Elliptic Equations.
Technical summary rept.,
P. L. Lions. Apr 81, 51p Rept no. MRC-TSR-2209
Contract DAAG29-80-C-0041

In this paper we study the existence of positive solutions of semilinear elliptic equations. Various possible behaviors of the nonlinearity are considered and in each case nearly optimal multiplicity results are obtained. The results are also interpreted in terms of bifurcation diagrams. (Author)

AD-A100 613/9 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Estimating Current Trend and Growth Rates in Seasonal Time Series.
Technical summary rept.,
George E. P. Box, and David A. Pierce. May 81, 35p Rept no. MRC-TSR-2210
Contract DAAG29-80-C-0041

The importance of appropriate stochastic models in choosing efficient methods of statistical analysis is discussed. The fitting to data of Seasonal Autoregressive Moving Average models is described and it is shown how trend may be estimated in an appropriate class of models of this kind. The procedure is illustrated for a model fitted to a money supply series published by the Federal Reserve Board. Error limits are calculated. In a series of appendices the properties of the adaptive coefficients which determine the trend estimates are derived. (Author)

AD-A100 614/7 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Measures of Lack of Fit for Response Surface Designs and Predictor Variable Transformations.
Technical summary rept.,
George E. P. Box, and N. R. Draper. Apr 81, 40p Rept no. MRC-TSR-2211
Contracts DAAG29-80-C-0041, DAAG29-80-C-0113

Some first and second order response surface designs are discussed from the point of view of their ability to detect certain likely kinds of lack of fit. This leads to consideration of conditions for representational adequacy of first and second order models in transformed predictor variables. (Author)

AD-A100 615/4 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Reply to Shafer: Lindley's Paradox.
Technical summary rept.,
D. V. Lindley. May 81, 12p Rept no. MRC-TSR-2212
Contract DAAG29-80-C-0041

This paper is an invited reply to Shafer, G. (1981). Lindley's paradox, which is to appear in the Journal American Statistical Association.

AD-A100 617/0 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Existence and Regularity of Solutions of Inhomogeneous Porous Medium Type Equations.
Technical summary rept.,
Paul Sacks. May 81, 47p Rept no. MRC-TSR-2214
Contract DAAG29-80-C-0041, Grant NSF-MCS80-02946
Sponsored in part by Grant NSF-MCS-01245.

A class of singular parabolic equations is studied. It is proved that an initial and boundary value problem associated with the equation has a bounded solution which is continuous in the interior of its domain of definition. The case of the inhomogeneous porous medium equation with bounded initial data is included. (Author)

AD-A100 624/6 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Nonlinear Eigenvalue Problems on Infinite Intervals.
Technical summary rept.,
Peter A. Markowich, and Richard Weiss. Apr 81, 34p Rept no. MRC-TSR-2199
Contract DAAG29-80-C-0041, Grant NSF-MCS79-27062

This paper is concerned with nonlinear eigenvalue problems of boundary value problems for ordinary differential equation posed on an infinite interval. It is shown that under certain analyticity assumptions - a domain in the complex plain can be identified, in which all eigenvalues are isolated. An intriguing way to solve such problems is to cut the infinite interval at a finite but large enough point and to impose additional, so called asymptotic boundary conditions at this far end. The obtained eigenvalue problem for the two point boundary value problem on this finite but large interval can be solved by an appropriate code. In this paper suitable asymptotic boundary conditions are devised and the order of convergence, as the length of the interval, on which these approximating problems are posed, converges to infinity, is investigated. Exponential convergence is shown for well posed approximating problems. (Author)

AD-A100 625/3 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Note on the Asymptotic Behavior of Nonlinear Semigroups and the Range of Accretive Operators.
Technical summary rept.,
Simeon Reich. Apr 81, 20p Rept no. MRC-TSR-2198
Contract DAAG29-80-C-0041

It is known that certain problems in partial differential equations may be interpreted as initial value problems for ordinary differential equations in Banach spaces. When such an evolution equation is governed by an accretive operator, then its solutions give rise to a nonlinear contraction semigroup. In this paper we study certain aspects of the asymptotic behavior of nonlinear semigroups and or resolvents of accretive operators. We also derive new results on their behavior at the origin. It turns out that the behavior of a nonlinear semigroup resembles that of the resolvent of its generator both at infinity and at the origin. (Author)

AD-A100 627/9 Not available NTIS
National Aerospace Lab., Amsterdam (Netherlands).
On a Generalized Falkner-Skan Equation,
A. E. P. Veldman, and A. I. van de Vooren. 8 Sep 80, 14p Rept no. NLR-MP-80035-U
Availability: Pub. in Jnl. of Mathematical Analysis and Applications, v75 n1 p102-111 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 686/5 PC **A02**/MF **A01**
North Carolina Univ. at Chapel Hill. Inst. of Statistics.
Multivariate Dependent Relevations with Applications, and Related Topics.
Technical rept.,
Norman L. Johnson, and Samuel Kotz. Jul 81, 14p Rept no. MIMEO SER-1342
Contract N00014-81-K-0301, Grant NSF-MCS80-21704

'Relevation' is the name given by Krakowski to the distribution of failure time of a replacement from an aging stock. The present authors (Johnson and Kotz) have extended this concept to include (1) hierarchal replacement systems and (2) dependence between lifetimes of original and replacement items. In this paper, we present some further developments, including first steps towards a synthesis of (1) and (2).

AD-A100 695/6 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Statistics.
Modern Design of Simulation Experiments.
Technical rept.,
Edward J. Dudewicz. Jun 81, 23p Rept no. TR-238
Contract N00014-78-C-0543

Design of simulation experiments has long been neglected by experimenters, who tend to attempt either to run only k experiments to evaluate k factors, or to run 2**k experiments (often infeasible, always costly). In this paper we survey the possibilities and show how to design for valid inferences with practical-sized experiments. (Author)

AD-A100 773/1 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Nonstandard Distributions in Two-Stage Least Squares.
Research rept.,
Mark Marcucci, and D. R. Jensen. May 81, 26p RR-Q-9, ARO-15194.9-M
Grant DAAG29-78-G-0172

In estimating the coefficient of an endogenous variable in a single equation of a system of linear equations, Anderson and Sawa (1973) expressed the distribution of the two-stage least-squares (TSLS) estimator as a doubly noncentral F distribution. We relax their assumption of independent Gaussian errors, taking instead a scale mixture of spherical Gaussian laws in a class containing the spherical stable distributions. The resulting distribution of the TSLS estimator is a mixture of doubly noncentral F distributions mixed over the noncentrality parameters, and for suitable mixtures the normal-theory distribution is robust. Computations reported for contaminated spherical Gaussian and spherical Cauchy errors are compared with the standard case. (Author)

AD-A100 782/2 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Efficient Computer Implementations of Fast Fourier Transforms.
Master's thesis,
John David Blanken. Dec 80, 19p Rept no. AFIT/GE/EE/80D-9
Availability: Microfiche copies only.

A comprehensive comparison of the most efficient Discrete Fourier Transform (DFT) techniques is presented. The DFT algorithms selected are the fixed radix Fast Fourier Transform (FFT), mixed radix FET, the Winograd Fourier Transform Algorithm (WFTA), and the Prime Factor Algorithm (PFA). Comparison of the algorithms is based on the number of real multiplications, additions, and memory arrays required as a function of sequence length N. This paper reviews the literature, selects the most efficient DFT FORTRAN programs available, develops the number of real multiplications and additions as a function of N, and compares the algorithms using tables and plots of real multiplications, additions, and memory arrays. Comparison shows that the WFTA and PFA require the least real multiplications and additions, but the fixed radix and mixed radix FFTs require the least memory. The mixed radix FFT is much more flexible than WFTA or PFA since N can be any length sequence. The WFTA and PFA are closely studied and tradeoffs between the two are discussed. Based on the results of the paper, an algorithm is presented to select the most efficient DFT for an N length sequence given the multiply speed, add speed, and memory size of the computer.

AD-A100 801/0 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Analytical and Numerical Problems Associated with Extending the Use of the Second order Even-parity Transport Equation.
Doctoral thesis,
John C. Souders, Jr. Jun 81, 137p Rept no. AFIT/DS/PH/81-2

The purpose of this research was to determine the feasibility of extending the use of the even-parity form of the Boltzmann Equation (EPFBE) to complex linear transport problems. Previous applica-

tions had been limited to problems involving simple geometry and low order scatter approximations. The air-over-ground problem was selected for this more complex extension since it required two-dimensional cylindrical geometry, anisotropic scatter, and a multigroup solution. To eliminate the ray effect in this problem, both the finite element and synthesis method were used. With these methods the Galerkin and collocation numerical techniques were applied. The Galerkin method proved infeasible because the integrals that resulted could not be efficiently evaluated either numerically or analytically. The collocation method allowed the analytic evaluation of all derivative and integral operations, but forced a fixed anisotropy on the solution. The multigroup method applied to the EPFBE produced a nested integral problem that increased proportionately with the number of energy groups. This research demonstrated that the finite element method can not be cost effectively used in solving the EPFBE for transport problems requiring complex geometries, anisotropic scatter, and a multigroup method. Criteria developed during this research for pursuing future work with the EPFBE is presented. (Author)

AD-A100 816/8 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
An Interactive Program for the Calculation and Analysis of the Parameter Sensitivities in a Linear, Time-Invariant System.
Master's thesis,
Linda Kneen Palmer. Mar 81, 111p Rept no. AFIT/GA/EE/81M-1

In this paper, a new algorithm is developed to calculate the output 'sensitivity matrix' of a linear, time-invariant, single-input single-output control system with piecewise constant input and output measurements taken at constant time intervals. The algorithm incorporates the singular value decomposition to investigate parameter identifiability and estimation accuracy in relation to the system as a whole and in relation to the model of the system. As a result, a structural condition on identifiability is imposed; and the system designer now has a tool to evaluate how well the model describes the system. The algorithm is verified by checking its results with those using a standard software package for numerical integration. It is then used to investigate input and structural design issues. (Author)

AD-A100 849/9 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Mathematics.
Complex Planar Splines.
Interim rept.,
Gerhard Opfer, and Madan L. Puri. May 81, 38p
Contract N00014-77-C-0659

In contradistinction to the known theory on complex splines which are defined on the boundary of a region and then extended into the interior by Cauchy's integral formula. We define complex planar splines on a region itself as a complex valued continuous function which is defined piecewise on suitable meshes of that region. The main idea is to use non-holomorphic functions as pieces, since holomorphic pieces would lead to just one holomorphic function on the whole region by a well known identity theorem in the theory of functions in one complex variable. Some of the techniques used are available from the theory of finite elements. But also are considered new aspects, namely mapping properties of a complex planar spline v and the difference f - v where f is in general a holomorphic function. For triangular, rectangular, parallelogram meshes and meshes on circular sectors, explicit expressions are provided and also properties of the newly introduced complex planar splines are studied.

AD-A100 901/8 PC **A03**/MF **A01**
North Carolina State Univ. at Raleigh. Operations Research.
International Conference on Applied Probability Models for Complex Stochastic Systems, Held at Jane S. McKimmon Center, North Carolina State University Raleigh, North Carolina on January 8-9, 1981.
Final rept.
1981, 37p ARO-18119.1-M
Contract DAAG29-81-M-0043

The purpose of the conference was to bring together several prominent mathematicians and engineers from Europe and the U.S. with common interests in applied probability models for complex stochastic systems, to interchange ideas with one another and with faculty, students, and researchers at the universities and research organizations in the Research Triangle area. Primary emphasis was placed on two topics: (1) distribution-free analysis of complex stochastic systems; and (2) optimal control of complex stochastic systems. This emphasis was motivated by the need for mathematical models to help describe and control such complex stochastic systems as networks of queues, such as arise in computer and communication systems and industrial job shops, and operating systems composed of parts subject to maintenance, failure, and replacement, such as arise in aerospace and military applications.

AD-A100 914/1 PC **A02**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Preconditioned Conjugate-Gradient Methods for Nonsymmetric Systems of Linear Equations.
research rept.,
Howard C. Elman. Apr 81, 14p Rept no. RR-203
Contract N00014-76-C-0277
Prepared in cooperation with Florida State Univ., Contract N00014-80-C-0076.

In this paper, we present a class of iterative descent methods for solving large, sparse, nonsymmetric systems of linear equations whose coefficient matrices have positive-definite symmetric parts. Such problems commonly arise from the discretization of non-self-adjoint elliptic partial differential equations. The methods we consider are modelled after the conjugate gradient method. They require no estimation of parameters and their rate of convergence appears to depend on the spectrum of A rather than ATA. Their convergence can also be accelerated by preconditioning techniques.

AD-A100 916/6 PC **A02**/MF **A01**
Missouri Univ.-Rolla. Dept. of Mathematics.
The Asymptotic Behavior of Monotone Percentile Regression Estimates,
F. T. Wright. 28 May 81, 16p Rept no. 4
Contract N00014-80-C-0322, Grant NSF-MCS78-01514

The least absolute deviations estimate of a monotone regression function was derived by Robertson and Waltman (1968). Assuming the observation points become dense in the domain of the regression function, Casady and Cryer (1976) obtained an upper bound on the almost sure rate of convergence of the estimator. The asymptotic distribution of the estimator at a point is obtained here and a faster rate of convergence is obtained. (Author)

AD-A100 947/1 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
On the Problem of Selecting Good Populations.
Mimeograph series,
Woo-Chul Kim. Aug 80, 41p Rept no. MMS-80-20
Contract N00014-75-C-0455
Prepared in cooperation with Seoul National Univ. (Korea).

The problem of selecting good populations out of k normal populations is considered in a Bayesian framework under exchangeable normal priors and additive loss functions. Some basic approximations to the Bayes rules are discussed. These approximations suggest that some well-known classical rules are 'approximate' Bayes rules. Especially, it is shown that Gupta-type rules are extended Bayes with respect to a family of the exchangeable normal priors for any bounded and additive loss function. Furthermore, for a simple loss function, the results of a Monte Carlo comparison of Gupta-type rules and Seal-type rules are presented. They indicate that, in general, Gupta-type rules perform better than Seal-type rules. (Author)

AD-A100 948/9 PC **A07**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
Some Results in the Theory of Subset Selection Procedures.
Mimeograph series,
Hwa-Ming Yang. Aug 80, 139p Rept no. MMS-80-22
Contract N00014-75-C-0455

Selection and ranking (ordering) problems in statistical inference arise mainly because the classical tests of homogeneity are often inadequate in certain situations where the experimenter is interested in comparing k ($>$ or $=$ 2) populations, treatments or processes with the goal of selecting one or more worth-while (good) population. Chapter I of this thesis considers the problem of selecting a subset containing all populations that are better than a control under the assumptions of an ordering prior. Here, by an ordering prior we mean that there exists a known simple or partial order relationship among the unknown parameters of the treatments (excluding the control). Three new selection procedures are proposed and studied. These procedures do meet the usual requirement that the probability of a correct selection is greater than or equal to a pre-determined number P^*. Two of the three procedures use the isotonic regression over the sample means of the k treatments with respect to the given ordering prior. Tables which are necessary to carry out the selection procedure with isotonic approach for the selection of unknown means of normal populations and gamma populations are given. Monte Carlo comparisons on the performance of several procedures for the normal or gamma means problem were carried out in several selected cases. The results of this study seem to indicate that the procedures based on isotonic estimators always have superior prformance, especially, when there are more than one bad population (in comparison with the control).

AD-A100 949/7 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
On (n-1)-Wise and Joint Independence and Normality of n Random Variables: An Example.
Mimeograph series
Wolfgang J. Buehler, and Klaus J. Miescke. Sep 80, 7p Rept no. MMS-80-27
Contract N00014-75-C-0455
Prepared in cooperation with Mainz Univ. (Germany, F.R.).

An example is given of a vector of n random variables such that any (n-1)-dimensional subvector consists of n-1 independent standard normal variables. The whole vector however is neither independent nor normal. (Author)

AD-A100 950/5 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
On Two-Stage Prodcedures for Finding A Population Better than a Control.
Mimeograph series,
Klaus J. Miescke. Sep 80, 25p Rept no. MMS-80-28
Contract N00014-75-C-0455
Prepared in cooperation with Mainz Univ. (Germany, F. R.).

A natural class of two-stage procedures is proposed which can be completely described and studied in terms of Neyman-Pearson testing theory, where the unsymmetry of tests, however, can be overcome to a considerable extent. As a typical result it is shown that optimality of tests carries over to optimality of two-stage procedures. Finally, under normality, comparisons are made in case of k = 2 with certain Bayesian procedures.

AD-A100 951/3 PC **A03**/MF **A01**
Claremont Men's Coll., CA. Inst. of Decision Science.
Maximum Likelihood Estimation for Two Parameter Decreasing Failure Rate Distributions Using Censored Data.
Technical rept.,
Janet M. Myhre, and Sam C. Saunders. Jun 81, 45p Rept no. 81-4
Contract N00014-78-C-0213
Prepared in cooperation with Washington State Univ., Pullman. Contract N00014-79-C-0755.

Problems of maximum likelihood estimation, for shape and scale parameters from certain decreas-

ing hazard rate distributions which are typically mixed-exponential or work-hardened, are discussed. Sufficient conditions on the mixing distribution are given that guarantee regular behavior of the hazard rate; this ensures, even with highly censored data, that the MLE's exist whenever the sample satisfies a certain condition quite likely in samples from DHR distribution; otherwise a constant hazard rate is assumed. Some computational methods are discussed and applications made. (Author)

AD-A100 994/3 PC **A02**/MF **A01**
Rockwell International, Thousand Oaks, CA.
Optimal Outlier Tests for a Weibull Model - To Identify Process Changes or to Predict Failure Times.
Technical paper 1 Jul 80-1 Jun 81,
Nancy R. Mann. May 81, 21p
Contracts N00014-80-C-0684, N00014-76-C-0723

Weibull outlier tests based on three different statistics are investigated with respect to their power optimality under various alternative models. Two of thes statistics are new in the context of outlier statistics; and one of these is shown to provide a more powerful test in certain situations than other more classical outlier test statistics. Critical values of the three statistics were computer-generated and are tabulated. The tabulated values allow one to identify 'treatment effects' resulting from unsuspected modifications to a process or to predict failure times in a life test. Numerical examples are given. (Author)

AD-A101 008/1 PC **A02**/MF **A01**
Rockwell International, Thousand Oaks, CA.
A Good Simple Percentile Estimator of the Weibull Shape Parameter for Use When all Three Parameters Are Unknown.
Technical paper 1 Sep 80-1 Apr 81,
Stelios H. Zanakis, and Nancy R. Mann. Mar 81, 17p
Contracts N00014-80-C-0684, N00014-76-C-0723
Prepared in cooperation with Florida International Univ., Miami. Dept. of Management and California Univ. at Los Angeles. Dept. of Biomathematics.

In this paper we consider a simple three-order-statistic asymptotically unbiased estimator of the Weibull shape parameter c for the case in which all three parameters are unknown. Optimal quantiles that minimize the asymptotic variance of this estimator c-tilde, are determined and shown to depend only on the true (unknown) shape parameter value c and in a rather insensitive way. Monte Carlo studies further verified that, in practice where the true shape parameter c is unknown, using always c-tilde with the optimal quantities that correspond to c=2.0 produces estimates, c-tilde-asterisk, remarkably close to the theoretical optimal. A second stage estimation procedure, namely recalculating c-tilde based on the optimal quantiles corresponding to c-tilde-asterisk, was not worth the additional effort. Benchmark simulation comparisons were also made with a new estimator of Wyckoff, Bain and Engelhardt (1980), one that appears to be the best of proposed closed-form estimators that use all sample observations. The proposed estimator, c-tilde-asterisk, should be of interest to practitioners having limited resources and to researchers as a starting point for more accurate iterative estimation procedures. It is independent of all three Weibull parameters and, for moderate sample sizes, it requires only the first, last and one other (early) ordered observation. (Author)

AD-A101 067/7 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Subjective Transfer Function Approach to Complex System Analysis.
Interim rept.,
Clairice T. Veit, and Monti Callero. Mar 81, 45p
Rept no. RAND/R-2719-AF
Contract F49620-77-C-0023

The subjective transfer function (STF) approach, a new procedure for analyzing complex systems that involve numerous cause and effect relationships among the system components, is described. A tactical air command and control and force employment system is used to illustrate measurement problems found with other procedures commonly used in complex system analyses and their resolutions in the STF approach. In the STF approach, systems 'experts' are involved in defining the complex system components and constructing their network of cause and effect relationships. Each hypothesized relationship is transformed into an STF that specifies how described components affect judged outcomes. The STFs are tested by using proper experimental designs in generating questionnaires that are given to 'experts.' Decisions are then made about the appropriateness of the initially hypothesized system components and the form of the STF. Appropriate STFs are used to assess how changes in the system affect system outcomes. (AUTHOR)

AD-A101 097/4 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Importance Sampling for Estimation of Small Probabilities.
Technical rept.,
Albert H. Nuttall. 23 Mar 81, 47p Rept no. NUSC-TR-6449

The use of importance sampling for estimation of small probabilities is illustrated by means of a signal-detection example. In particular, false alarm probabilities in the ten to the minus 7th power range are accurately estimated by means of only 1000 independent trials. The fundamental variance-reducing capability of importance sampling is explored and used to significantly improve the performance of the probability estimate for the detection example considered. Guidelines for choosing good data-generation algorithms are presented. (Author)

AD-A101 098/2 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Statistics of Nonlinearly Transformed Coherence Estimates.
Technical rept.,
Albert H. Nuttall. 12 Mar 81, 43p Rept no. NUSC-TR-6445

An asymptotic relation for the average value of any nonlinear transformation of a magnitude-squared-coherence estimate is derived. It is utilized to determine the bias, variance, and mean-square error of the transformed coherence estimate. It is found that the arc tanh (x(1/2)) transformation is the only one with variance independent of the true coherence value to O(N(-1)), and that the 1n(x) transformation is the only one with zero bias, to exponential order in N. Here, N is the number of data pieces employed in the estimation of the coherence. Extensions to terms of O(N(-2)) are made and presented for a v-th law device also. (Author)

CONF-810251-1 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Algorithms for Sparse, Symmetric, Definite Quadratic lambda-Matrix Eigenproblems.
D. S. Scott, and R. C. Ward. 1981, 8p
Contract W-7405-ENG-26
1981 army numerical analysis and computers conference, Huntsville, AL, USA, 26 Feb 1981.

Methods are presented for computing eigenpairs of the quadratic lambda-matrix, M lambda exp 2 + C lambda + K, where M, C, and K are large and sparse, and have special symmetry-type properties. These properties are sufficient to insure that all the eigenvalues are real and that theory analogous to the standard symmetric eigenproblem exists. The methods employ some standard techniques such as partial tri-diagonalization via the Lanczos Method and subsequent eigenpair calculation, shift-and- invert strategy and subspace iteration. The methods also employ some new techniques such as Rayleigh-Ritz quadratic roots and the inertia of symmetric, definite, quadratic lambda-matrices. (ERA citation 06:024524)

CONF-810406-5 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Identification of Multivariate Linear Systems.
J. M. Griffith. 1981, 6p
Contract AC07-76ID01570
27. international instrumentation symposium, Indianapolis, IN, USA, 27 Apr 1981.

This paper considers the problem of modeling multivariate linear systems where noisy output measurements are the only available data. The techniques presented are valid for a class of canonical forms. Results from several simulations demonstrate the capability for structure and parameter estimation. (ERA citation 06:022971)

LA-UR-81-1409 PC **A02**/MF **A01**
Harding Coll., Searcy, AR. Dept. of Mathematics.
K-Line Iterative Methods: A Conjugate-Gradient Approach.
D. Kratzer, S. V. Parter, and M. Steuerwalt. 29 Mar 81, 8p CONF-810628-2
Contract W-7405-ENG-36
IMACS symposium on computer methods for PDE's, Bethlehem, PA, USA, 30 Jun 1981.

The generalized conjugate gradient scheme based on the k-line block Jacobi splitting A = M-N was studied for solving model two-dimensional parabolic and elliptic difference equations AU = F tilde. A represents the matrix ch/sup alpha /-h exp 2 delta /sub h/. Eigenvalues of M exp -1 N cluster, and the cluster radii decrease as ch/sup alpha / or k increases. Computations with k = 4, 8, 16, 32, and ch/sup alpha / = 0, h, 2 are discussed. (ERA citation 06:024526)

N81-26778/3 PC **A02**/MF **A01**
Iowa State Univ., Ames. Dept. of Mathematics.
Symbolic Solution of Linear Differential Equations.
R. B. Feinberg, and R. G. Grooms. 1981, 19p
NASA-CR-164522
Grant NSG-1538

An algorithm for solving linear constant-coefficient ordinary differential equations is presented. The computational complexity of the algorithm is discussed and its implementation in the FORMAC system is described. A comparison is made between the algorithm and some classical algorithms for solving differential equations.

N81-26779/1 PC **A03**/MF **A01**
Hampton Inst., VA.
STAR Adaptation of QR Algorithm.
S. N. Shah. Jun 81, 29p NASA-CR-165730
Contract NCC1-7

The QR algorithm used on a serial computer and executed on the Control Data Corporation 6000 Computer was adapted to execute efficiently on the Control Data STAR-100 computer. How the scalar program was adapted for the STAR-100 and why these adaptations yielded an efficient STAR program is described. Program listings of the old scalar version and the vectorized SL/1 version are presented in the appendices. Execution times for the two versions applied to the same system of linear equations, are compared.

PB81-216491 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Stability and Convergence for Nonlinear Difference Schemes are Equivalent,
Elemer E. Rosinger. Apr 80, 16p TWISK-142

The Lax-Richtmyer theorem, establishing the equivalence between the stability and convergence of linear difference schemes that are consistent with properly posed linear evolution partial differential equations, is extended to the corresponding general nonlinear case, noticing that in the proof of the implication 'convergent approaching stable' for the linear case it is possible to avoid using the principle of uniform boundedness of linear operators on Banach spaces.

PB81-216509 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
On the Convergence, Invariance and Related Aspects of a Modification of Huang's Algorithm,
Jacob Flachs. Feb 80, 41p TWISK-140

A certain generalization of the Huang family of updates is considered. Discussed is firstly, convergence, dependence on parameters, and the descent property; secondly, invariance under nonlin-

ear scaling, conjugacy of search directions, and the possibility of achieving a better approximation of the inverse of the Hessian. The last three aspects are shown to be dependent on particular choices of parameters. A numerical experiment is presented comparing the performances of the usual and modified BFGS algorithms.

12B. Operations Research

AD-A100 602/2 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On Parametric Linear and Quadratic Programming Problems.
Technical summary rept.,
Klaus Ritter. Mar 81, 38p Rept no. MRC-TSR-2197
Contract DAAG29-80-C-0041

An algorithm is described for determining the optimal solution of parametric linear and quadratic programming problems as an explicit piecewise linear function of the parameter. Each linear function is uniquely determined by an appropriate subset of active constraints. For every critical value of the parameter a new subset has to be determined. A simple rule is given for adding and deleting constraints from this subset. (Author)

AD-A100 689/9 PC **A02**/MF **A01**
Stanford Univ., CA. Systems Optimization Lab.
A Nested-Decomposition Approach for Solving Staircase-Structured Linear Programs.
Technical rept.,
Philip G. Abrahamson. Aug 80, 18p Rept no. SOL-80-20
Contracts N00014-75-C-0267, DE-AC03-76SF00326
Sponsored in part by Contract DE-AT03-76ER72018 and Grants NSF-MCS76-81259, NSF-MCS79-26009 and NSF-ENG77-06761. Presented at Workshop on Large-Scale Linear Programming, 2-6 June 80, Austria.

The algorithm solves a T-period staircase-structured linear program by applying a compact basis-inverse scheme for the Simplex Method in conjunction with a choice mechanism which uses the dual of the Nested Decomposition Principle of Manne and Ho to determine the incoming basic column. A sequence of one-period problems is solved in which, typically, information is provided to period t from previous and subsequent periods in the form of surrogate columns and modified right-hand side, and surrogate rows and modified cost coefficients, respectively. (Author)

AD-A100 992/7 PC **A03**/MF **A01**
Wharton School, Philadelphia, PA. Dept. of Decision Sciences.
A Generalized Assignment Heuristic for Vehicle Routing.
Marshall L. Fisher, and Ramchandran Jaikumar. Aug 79, 33p Rept no. 79-10-04
Contract N00014-78-C-0302

We consider a common variant of the vehicle routing problem in which a vehicle fleet delivers products stored at a central depot to satisfy customer orders. Each vehicle has a fixed capacity, and each order uses a fixed portion of vehicle capacity. The routing decision involves determining which of the demands will be satisfied by each vehicle and what route each vehicle will follow in servicing its assigned demand in order to minimize total delivery cost. We present a heuristic for this problem in which an assignment of customers to vehicles is obtained by solving a generalized assignment problem with an objective function that approximates delivery cost. This heuristic has many attractive features. It has outperformed the best existing heuristics on a sample of standard test problems. It will always find a feasible solution if one exists, something no other existing heuristic can guarantee. It can be easily adapted to accommodate many additional problem complexities. By parametrically varying the number of vehicles in the fleet, our method can be used to optimally solve the problem of finding the minimum size fleet that can feasibly service the specified demand. (Author)

AD-A101 150/1 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Vehicle Routing Algorithms for Local Delivery at Naval Supply Centers.
Master's thesis,
Clifford O. Clausen. Mar 81, 132p

This thesis examines the local delivery operations at the Naval Supply Centers in Oakland and San Diego. The local delivery problem is formulated as a model applicable to these supply centers. Specifically, the model involves routing a fleet of vehicles from a central depot to each of a set of customers so as to satisfy their demands. Twelve heuristic solution methods applicable to this model are reviewed and illustrated with examples. They are also compared with respect to quality of resulting solutions and computational efficiency. Finally, recommendations on improving the routing of vehicles at the two Naval Supply Centers are made. (Author)

N81-26817/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Decentralized Control of Markovian Decision Processes: Existence sigma-Admissable Policies.
A. Greenland. Aug 80, 19p NASA-TM-82108

The problem of formulating and analyzing Markov decision models having decentralized information and decision patterns is examined. Included are basic examples as well as the mathematical preliminaries needed to understand Markov decision models and, further, to superimpose decentralized decision structures on them. The notion of a variance admissible policy for the model is introduced and it is proved that there exist (possibly nondeterministic) optional policies from the class of variance admissible policies. Directions for further research are explored.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

ANL/EES-TM-135 PC **A03**/MF **A01**
ECA, Inc., Woodridge, IL.
Atmospheric Corrosion of Batten and Enclosure Materials for Flat-Plate Solar Collectors.
Sep 80, 38p
Contract W-31-109-ENG-38

As part of the Solar Reliability and Materials Program at Argonne National Laboratory, the atmospheric-corrosion-monitoring project is to assess the materials used for battens and enclosures for flat-plate solar collectors. Sensors at nine test sites have provided atmospheric data. Other data have been obtained by analyzing corrosion samples that were exposed for varying periods of time. This interim report summarizes the results of the first test period. (ERA citation 06:021936)

BNL-29480 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Ground Coupling and Single-Blow Thermal Storage in a Double-Envelope House.
H. T. Ghaffari, and R. F. Jones. 1981, 6p CONF-810509-29
Contract AC02-76CH00016
Annual conference of the International Solar Energy Society, Philadelphia, PA, USA, 26 May 1981.

The possibility of ground thermal storage and coupling in a double-shell house is investigated. Temperature distribution in the ground, utilizing measured ground temperatures, is obtained, and the amount of heat retrieval is assessed. One experimental model and several hypothetical models are introduced; their effects and advantages are compared. (ERA citation 06:022169)

CONF-810567-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Development Support by ORNL for TVA AFBC Pilot Plant.
R. S. Holcomb, M. E. Lackey, C. S. Daw, and G. P. Zimmerman. 1981, 14p
Contract W-7405-ENG-26
64. chemical conference, Halifax, Nova Scotia, Canada, 31 May 1981.

Oak Ridge National Laboratory (ORNL) has been involved for the past several years in the assessment, design and development of fluidized bed combustors. The current effort includes a development program for an AFBC-gas turbine industrial cogeneration plant, a PFBC utility plant assessment and design study, and technical and development support for the TVA Pilot Plant program. The FBC experience and R and D capabilities of ORNL complement the power plant design, construction and operating experience of TVA in the AFBC Pilot Plant program. The technical support provided by ORNL includes a number of analytical and experimental tasks in several area of AFBC technology. The major development effort has been in the areas of combustion performance and coal feeding. Sulfur capture performance data have been obtained in the ORNL Bench Scale Combustor for candidate limestones with once-through feeding and with fines recycle. The target performance of 90% SO sub 2 retention was achieved with a Ca/S mole ratio of 2.1 with fines recycle. A fundamental test program on the pneumatic transport of coal and coal-limestone mixtures was conducted to investigate the influence of particle size distribution, surface moisture and transport velocity, on pressure drop, saltation and plugging. (ERA citation 06:021992)

DE81023033 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Air Infiltration in Buildings.
M. H. Sherman. Oct 80, 125p LBL-10712
Contract W-7405-ENG-48
Thesis.
Microfiche only after original copies are exhausted.

A physical model of infiltration in buildings that can be used to predict the infiltration for a wide range of construction types and climate regions is presented. The problems associated with commonly-used tracer gas methods for measuring infiltration were examined in detail so that results obtained from the model could be properly compared with actual measurements. In addition, a simple model of the hydrodynamics of typical leaks in the building envelope was devised in order to study the physical processes of infiltration (i.e., the flow of air through cracks in the structure of the building). Finally, a method for quantifying the leakage of the building envelope (the quantity analogous to envelope thermal conductance) was developed. The name given to this measurement technique is AC pressurization. Although other methods exist for measuring the leakage of a building envelope, AC pressurization is far more accurate and can be used at lower pressures than any existing methods. The model, based on the determination of the effective leakage area, was used to predict the infiltration at 15 separate sites. Pressurization was used to calculate leakage area and then was used to calculate infiltration. Findings were then compared to direct measurements of infiltration at the sites. Agreement between the model and direct measurement by tracer gas techniques was +- 20% overall - a degree of accuracy far surpassing any previous model of infiltration capable of being generally applied. (ERA citation 06:023713)

DOE/CS/23337-2 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN. Ray W. Herrick Labs.
Seasonal Performance of Air Conditioners - an Analysis of the DOE Test Procedures: The Thermostat and Measurement Errors. Report No. 2.
G. D. Lamb, and D. R. Tree. Jan 81, 194p
Contract AC02-80CS23337

Two aspects of the DOE test procedures are analyzed. First, the role of the thermostat in controlling the cycling of conditioning equipment is investigated. The test procedures call for a cycling scheme of 6 minutes on, 24 minutes off for Test D. To justify this cycling scheme as being representative of cycling in the field, it is assumed that the thermostat is the major factor in controlling the cycle rate. This assumption is examined by studying a closed-loop feedback model consisting of a thermostat, a heating/cooling plant and a conditioned space. Important parameters of this model are individually studied to determine their influence on the system. It is found that the switch differential and the anticipator gain are the major parameters in controlling the cycle rate. This confirms the thermostat's dominant role in the cycling of a system. The second aspect of the test procedures concerns transient errors or differences in the measurement of cyclic capacity. In particular, errors due to thermocouple response, thermocouple grid placement, dampers and nonuniform velocity and temperature distributions are considered. Problems in these four areas are mathematically modeled and the basic assumptions are stated. Results from these models help to clarify the problem areas and give an indication of the magnitude of the errors involved. It is found that major disagreement in measured capacity can arise in these four areas and can be mainly attributed to test set-up differences even though such differences are allowable in the test procedures. An understanding of such differences will aid in minimizing many problems in the measurement of cyclic capacity. (ERA citation 06:023707)

DOE/CS/30133-T1(V.1) PC **A12**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Low-Cost Evacuated-Tube Solar Collector. Final Report.
10 Feb 81, 262p
Contract AC04-78CS30133

A prototype design for an evacuated tube air cooled solar collector module has been completed. A product cost study, based on the production of 60,000 of the prototype modules per year (approx. 1,000,000 square feet annually), estimates that the module as shipped would have a cost at inventory of $7.09 to $7.40 per square foot of aperture. Computer programs were developed to predict the optical and thermal performance of the module. Antireflective coatings (porous aluminum oxide) which could be formed by spraying or dipping were demonstrated but degraded more rapidly when exposed to a high humidity ambient than acid etched films. A selective black chromium oxide multi-layered graded film was vapor deposited which had an absorptivity of about 0.9 and an emissivity of 0.03. When the film was heated to temperatures of 400 exp 0 C in a gettered vacuum for as little as 24 hours, however, irreversible changes took place both between and within coating layers which resulted in alpha decreasing to about 0.73 and epsilon increasing to 0.14. The product cost studies indicate that module design changes are warranted to reduce product cost prior to tooling for production. (ERA citation 06:021937)

DOE/CS/30169-6 PC **A03**/MF **A01**
Davis Alternative Technology Associates, CA.
Suncatcher Monitoring Project. Semi-Annual Technical Report, July-December 1980.
K. Treleven, and B. T. Maeda. 27 Apr 81, 30p
Contract FG02-79CS30169

Data collected during the second half of 1980 are presented for the Suncatcher - a passive solar heating system. Data include outdoor and indoor temperatures, auxiliary gas used, heating degree days, load and performance data, and storage temperatures in graphical and in tabular form. Work on the data acquisition system is briefly described. Some relevant computer codes are listed. (ERA citation 06:021846)

DOE/CS/31467-T2 PC **A09**/MF **A01**
Singer Co., Fairfield, NJ.
Analytical Selection of Marketable SAHP Systems. Final Report, September 30, 1977-December 31, 1979.
W. Kahan. Jan 80, 184p SAN-1467-1
Contract AC03-77CS31467

For the effective marketing of energy conserving heating systems which have high initial costs, such as the solar assisted heat pump (SAHP), it is imperative to identify those climatic regions, load profiles, and system characteristics for which such systems are economically promising. This report summarizes efforts to develop a quick and efficient means of performing this identification. These efforts were separated into two distinct studies, a marketing study and a technical study of five energy conserving systems; and stand-alone heat pump, a stand-alone solar energy system, and a series, a parallel, and a dual source SAHP system. One of the primary results of the marketing study was the identification of the portion of the HVAC market into which the initial marketing thrust of these systems should be concentrated. In addition, several factors which influence the sales of these systems were identified. The technical study concentrated on the development and use of an analytical model of each of the systems. This model was designed to quickly size, in a specific climatic region, the system components for an economic optimum; i.e., for a minimum life cycle cost. Then the one energy conserving system which has the lowest life cycle cost, and thus the best potential, can be identified. It was found that, at present costs of electricity, the air-to-air heat pump has the lowest life cycle cost and hence is considered most marketable. At significantly higher electricity costs, the series SAHP system is the most marketable one because it has the lowest life cycle cost of the five energy conserving systems studied. (ERA citation 06:023350)

DOE/CS/32867-T2 PC **A08**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Direct Contact Liquid-Liquid Heat Exchanger for Solar Heated and Cooled Buildings. Final Report, January 1, 1979-May 30, 1980.
S. Karaki, and P. Brothers. Jun 80, 161p COO-2867-8
Contract AS02-76CS32867

The technical and economic feasibility of using a direct contact liquid-liquid heat exchanger (DCLLHE) storage unit in a solar heating and cooling system is established. Experimental performance data were obtained from the CSU Solar House I using a DCLLHE for both heating and cooling functions. A simulation model for the system was developed. The model was validated using the experimental data and applied in five different climatic regions of the country for a complete year. The life-cycle cost of the system was estimated for each application. The results are compared to a conventional solar system, using a standard shell-and-tube heat exchanger. It is concluded that while thare is a performance advantage with a DCLLHE system over a conventional solar system, the advantage is not sufficiently large to overcome slightly higher capital and operating costs for the DCLLHE system. (ERA citation 06:023353)

DOE/CS/34193-T1 PC **A07**/MF **A01**
Solaron Corp., Englewood, CO.
Development of a High Performance Air Heater Through Use of an Evacuated Tube Cover Design. Final Report.
D. E. Jones, L. E. Shaw, and G. O. G. Loef. 1981, 137p
Contract AC04-78CS34193

Work leading to the development of a high performance air heater through use of an evacuated tube cover design is detailed. Work consisted of a literature survey, fabrication of the tubes, solar transmittance tests, thermal conductance tests, collector design, prototype construction; prototype testing, and finally performance and cost evaluation. Two types of evacuated tubes were manufactured, clear tubes and tubes with an infrared reflective coating. The tubes were arranged parallel in a close packed flat array to form a transparent cover for the collector. The array transmittance of clear tubes is similar to that of two flat sheets of low absorptance glass. The coated tube array had substantially reduced transmittance. Thermal conductance tests indicated that the tube arrays perform similar to two flat sheets of glass with an evacuated space. Convection off the lower and upper surface of the tube arrays was enhanced by the larger surface area which somewhat offset the advantage of the vacuum. Two prototype collectors were designed, built, and tested: (1) clear tube array over a selective surface; (2) coated tube array over a non-selective surface. The collectors were tested side by side with two baseline collectors, a selective surface collector without a tube array and a standard Solaron collector. Test results indicate the tube collector performs better at higher temperatures than either baseline or the coated tube collector, but the performance increase is not outstanding. Inclusion of the evacuated tube cover concept is probably not cost competitive with other collectors in either the high or low temperature range. (ERA citation 06:023374)

DOE/CS/40037-T3 PC **A03**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Labs.
Pulverized Coal Firing of Aluminum Melting Furnaces. Second Annual Technical Progress Report, July 1979-June 1980.
C. E. West, and D. L. Stewart. Aug 80, 43p
Contract AC01-78CS40037

The ultimate objective of this program is the commercial demonstration of an efficient, environmentally acceptable coal firing process suitable for implementation on melting furnaces throughout the aluminum industry. To achieve this goal, the program has been divided into two phases. Phase I has proceeded through design and construction of a 350 pound (coal) per hour staged slagging cyclone combustor (SSCC) attached to a 7-ft diameter aluminum melting ladle furnace. Process development will culminate with a 1000 pph prototype SSCC firing a 40,000 pound capacity open hearth melting furnace at the Alcoa Laboratories. Phase II implementation is currently planned for Alcoa's Lafayette, IN, Works, where two of the ingot plant's five open hearth melting furnaces will be converted to utilize coal. In addition to confirmation of data gathered in Phase I, the effect of extended production schedule operation on equipment and efficiencies will be determined. This work would begin in 1982 pursuant to technical and economic evaluation of the process development at that time. (ERA citation 06:023074)

DOE/CS/40037-T4 PC **A03**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Labs.
Pulverized Coal Firing of Aluminum Melting Furnances. Quarterly Technical Report, January 1, 1980-March 31, 1980.
C. E. West. Oct 80, 30p
Contract AC01-78CS40037

The ultimate objective of this program is the commercial demonstration of an efficient, environmentally acceptable coal firing process suitable for implementation on melting furnaces throughout the aluminum industry. To achieve this goal, the program has been divided into two phases. Phase I has begun with the design and construction of a 350 pound (coal) per hour staged slagging cyclone combustor (SSCC) attached to a 7-ft diameter aluminum melting ladle furnace. Process development will culminate with a 1000 pph prototype SSCC firing a 40,000 pound capacity open hearth melting furnace at the Alcoa Laboratories. Phase II implementation is currently planned for Alcoa's Lafayette, IN, Works, where two of the ingot plant's five open hearth melting furnaces will be converted to utilize coal. In addition to confirmation of data gathered in Phase I, the effect of extended production schedule operation on equipment and efficiencies will be determined. This work would begin in 1982 pursuant to technical and economic evaluation of the process development at that time. (ERA citation 06:023075)

DOE/ET/20279-131 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Retrofitting Residences with Photovoltaic/Thermal Collector Systems.
D. B. Sheldon, and S. M. Frank. 1981, 5p CONF-810812-5
Contract AC02-76ET20279
IECEC conference, Atlanta, GA, USA, 9 Aug 1981.

It is shown that photovoltaic/thermal collector areas as low as 10 m exp 2 are favorably matched to the operation of a conventional warm-air heating system. This was done by simulating the performances of three combined-collector heating systems which were designed to operate primarily in the boosting mode. Comparison of the annual performances of these systems permits determination of which components should be included in a retrofit system. The additional components considered are a thermal storage tank and a heat pump. (ERA citation 06:023354)

DOE/IR/05106-T5 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Building Automation Systems. Information Bulletin of the Energy Task Force of the Urban Consortium.
1980, 29p
Contract FG02-78IR05106

A description of what an automation system is, what it does, and how it works in buildings is presented. The current State of the Art is described and recommendations are made for selecting candidate buildings and contracting for a system. The benefits which can be obtained from automation vary with the local situation (energy cost, size and location of buildings, labor situation, and method of building operation and maintenance) and to illustrate this, seven cities and counties around the country are cited which have successfully installed automation systems. Names of contacts for further information are provided. (ERA citation 06:020399)

DOE/IR/05106-T8 PC **A03**/MF **A01**
Planning and Management Associates of Greater Washington, Inc., DC.
Local Government Guide to the Emerging Technologies of Energy-Efficient Motors and Heat Pumps. Energy Technology Report of the Energy Task Force of the Urban Consortium.
1980, 39p
Contract FG02-78IR05106

Information is presented to provide a local government manager with a basic background in energy efficient motors and heat pump technologies. An overview of each technology and the issues and considerations associated with their application are presented. Discussions cover installation and maintenance requirements, equipment availability, costs and risks/benefits. Data describing demonstration sites for solar assisted heat pump systems and contacts for further information are provided. (ERA citation 06:022250)

DOE/MC/16230-152 PC **A14**/MF **A01**
Pope, Evans, and Robbins, Inc., New York.
Rivesville Multicell Fluidized Bed Boiler. Annual Technical Progress Report. July 1978-June 1979.
Aug 80, 305p
Contract AC21-81MC16230

Design, construction and test program of a 300,000 lb/hr steam generating capacity multicell fluidized bed boiler (MFB), as a pollution free method of burning high-sulfur or highly corrosive coals, is being carried out. The concept involves burning fuels such as coal, in a fluidized bed of limestone particles that react with the sulfur compounds formed during combustion to reduce air pollution. Nitrogen oxide emissions are also reduced at the lower combustion temperatures. The CaSO sub 4 produced in the furnace is discharged with the ash or regenerated to CaO for reuse in the fluidized bed. Information is presented on continued operation of the Rivesville MFB steam generating plant in a commercial mode and for determining performance and emission characteristics; studies and tests on flyash characterization and reinjection, fuel feed eductors and needles, air distributor, corrosion-erosion and sulfur capture; engineering studies to improve MFB performance and reliability. (ERA citation 06:022001)

DOE/MC/16230-153 PC **A04**/MF **A01**
Pope, Evans, and Robbins, Inc., New York.
Rivesville Multicell Fluidized-Bed Boiler. Quarterly Technical Progress Report, October-December 1979.
1980, 61p
Contract AC21-81MC16230

The objective of this program is to design, construct and test a multicell fluidized-bed boiler as a pollution-free method of burning high-sulfur or highly corrosive coals without excessive maintenance problems. The fluidized-bed boiler will provide approximately 300,000 pounds of steam per hour. Steam pressure and temperature conditions were selected to meet requirements of the site at which the boiler was installed. (ERA citation 06:022002)

DOE/MC/16230-156 PC **A05**/MF **A01**
Pope, Evans, and Robbins, Inc., New York.
Rivesville Multicell Fluidized Bed Boiler.
Mar 81, 83p
Contract AC21-81MC16230

One objective of the experimental MFB at Rivesville, WV, was the evaluation of alternate feed systems for injecting coal and limestone into a fluidized bed. A continuous, uniform feed flow to the fluid bed is essential in order to maintain stable operations. The feed system originally installed on the MFB was a gravity feed system with an air assist to help overcome the back pressure created by the fluid bed. The system contained belt, vibrating, and rotary feeders which have been proven adequate in other material handling applications. This system, while usable, had several operational and feeding problems during the MFB testing. A major portion of these problems occurred because the coal and limestone feed control points - a belt feeder and rotary feeder, respectively - were pressurized in the air assist system. These control points were not designed for pressurized service. An alternate feed system which could accept feed from the two control points, split the feed into six equal parts and eliminate the problems of the pressurized system was sought. An alternate feed system designed and built by the Fuller Company was installed and tested at the Rivesville facility. Fuller feed systems were installed on the north and south side of C cell at the Rivesville facility. The systems were designed to handle 10,000 lb/hr of coal and limestone apiece. The systems were installed in late 1979 and evaluated from December 1979 to December 1980. During this time period, nearly 1000 h of operating time was accumulated on each system. (ERA citation 06:022003)

DOE/NASA/CR-161724 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Economic Evaluation. Final Report for SEECO Lincoln, Lincoln, Nebraska.
Sep 80, 95p
Contract AI01-76CS31037

The economic analysis of the solar energy system that was installed at Lincoln, Nebraska is developed for this and four other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f-chart design procedure with inputs based on the characteristics of the installed system and local conditions. The results are expressed in terms of the economic parameters of present worth of system cost over a projected twenty year life: life cycle savings, year of positive savings and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainties in constituent system and economic variables is also investigated. Although budget constraints preclude an economic reevaluation of each of the sites, a similar site, Carlsbad, New Nexico, was done. When 1985 escalated values for fuel, costs, mass production, and improved design and installation techniques were applied, a significantly higher degree of savings was realized. (ERA citation 06:021854)

DOE/NASA/CR-161725 PC **A06**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Economic Evaluation Final Report for Colt Pueblo, Pueblo, Colorado.
Sep 80, 107p
Contract AI01-76CS31037

The economic analysis of the solar energy system that was installed at Pueblo, Colorado is developed for this and five other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f-chart design procedure with inputs based on the characteristics of the installed system and local conditions. The results are expressed in terms of the economic parameters of present worth of system cost over a projected twenty year life: life cycle savings, year of positive savings and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainties in constituent system and economic variables is also investigated. Although budget constraints preclude an economic reevaluation of each of the sites, a similar site, Carlsbad, New Mexico, was done. When 1985 escalated values for fuel, costs, mass production, and improved design and installation techniques were applied, a significantly higher degree of savings was realized. (ERA citation 06:021855)

DOE/NASA/CR-161727 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Economic Evaluation: For Contemporary Newnan, Newnan, Georgia. Final Report.
Sep 80, 96p
Contract AI01-76CS31037

The economic analysis of the solar energy system that was installed at Newnan, Georgia is developed for this and four other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f-chart design procedure with inputs based on the characteristics of the installed system and local conditions. The results are expressed in terms of the economic parameters of present worth of system cost over a projected twenty year life: life cycle savings, year of positive savings and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainties in constituent system and economic variables is also investigated. The assumptions used in the economic analysis of this report are not typical of savings that could be realized in future installations of these types of solar heating and cooling systems. Although budget constraints preclude an economic reevaluation of each of the sites, a similar site, Carlsbad, New Mexico, was done. When 1985 escalated values for fuel, costs, mass production, and improved design and installation techniques were applied, a significantly higher degree of savings was realized. Similar results could be expected for the site in this report. (ERA citation 06:023356)

DOE/NASA/CR-161728 PC **A06**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Economic Evaluation. Final Report for IBM System 3, Glendo, Wyoming.
Sep 80, 102p
Contract AI01-76CS31037

The economic analysis of the solar energy system that was installed at Glendo, Wyoming Operational Test Site (OTS) is developed for Glendo and four other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f-chart design procedure with inputs based on the characteristics of the parameters of present worth of system cost over a projected twenty year life: life cycle savings, year of positive savings, and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainties in constituent system and economic variables is also investigated. The assumptions used in the economic analyses of this report are not typical savings that could be realized in future installations of these types of solar heating and cooling systems. Although budget constraints preclude an economic reevaluation of each of the sites, Carlsbad, New

Mexico, was done. When 1985 escalated values for fuel, costs, mass production, and improved design and installation techniques were applied, a significantly higher degree of savings was realized. Similar results could be expected for the site in this report. (ERA citation 06:021857)

DOE/R5/10146-2 PC **A03**/MF **A01**
Kimpel (Timothy and Martha), Zanesville, OH.
Using the Sun and Waste Wood to Heat a Central Ohio Home. Final Technical Report.
1981, 39p
Contract FG02-79R510146

The description of a house in Ohio built on a south facing slope with two levels above ground on the north, east, and west sides and three levels exposed to the southern winter Sun is presented. The floor plan, a general history of the project, the operation of the system, the backup heat source (wood), the collection of data, and the procedure for determining actual heat loss are described. Additionally, the calculation of the solar contribution percentage and the amount of mass to be included in the greenhouse and problems with an indirect gain wall are discussed. The location of the wood stove in the system is noted. The east wall temperature data are given. Soil temperature, air infiltration, thermal comfort, and energy usage are discussed. (ERA citation 06:023358)

DOE/SF/10549-T1 PC **A08**/MF **A01**
E-Tech, Inc., Atlanta, GA.
Solar-Assisted Heat Pump Field Performance Evaluation. Final Report.
28 Nov 80, 151p
Contract AC03-79SF10549

An analysis carried out to determine some guidelines to use in laying out six ground coil installations is summarized. The installation of the solar-assisted ground coupled heat pumps is described. The instrumentation employed at each of the installations in order to obtain performance data is discussed. (ERA citation 06:021859)

DOE/SF/10606-T1 PC **A07**/MF **A01**
Foster Wheeler Development Corp., Livingston, NJ.
Solar Repowering/Industrial Retrofit System for the Provident Energy Company Refinery. Topical Report, September 28, 1979-July 15, 1980.
R. Raghavan. Mar 80, 146p
Contract AC03-79SF10606

This report summarizes the program activities from the beginning of the project (October 1979) to February 15, 1980. The primary effort during the first portion of the period was the preparation of the System Requirements Specification. Following this effort, the system and subsystem trade-off studies and analyses were performed. The results of these studies produced the most practical conceptual design for the Provident Refinery central receiver solar energy plant. (ERA citation 06:021860)

DOE/TIC-1022079 PC **A03**/MF **A01**
Michigan Energy Administration, Lansing.
Energy Audit Workbook: For Local Government and Related Agencies.
Jan 79, 39p

A workbook defining the energy audit and information on conducting and reporting an energy audit and selecting team members is presented. A guide to the energy management form, used to collect the data required, is included. Forms for recording information on the building profile, the energy audit, and certification are also included. (ERA citation 06:022257)

DOE/TIC-1022096 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Ceramic Heat Pipe Development. Semi-Annual Report, 1 October 1980-31 March 1981.
M. Merrigan. May 81, 23p
Contract W-7405-ENG-36

Progress is reported in the Ceramic Heat Pipe Development Program which is directed to the development of heat pipes for use in high-temperature heat exchangers. The development of ceramic heat pipe recuperator elements involves the selection and test of materials and fabrication techniques, subscale tests, design and test of components for full-scale recuperator applications, and demonstration of heat pipes in subscale and full-scale recuperator installations. Work on the program has involved the selection of candidate pipe envelope materials, working fluids, and protective liner materials based on temperature limits and compatibility considerations. Alumina-niobium-lithium and silicon carbide-tungsten-sodium combinations were selected for initial tests. The first successful operation of high temperature ceramic heat pipes was achieved using chemical vapor deposited (CVD) SiC as a container material and CVD tungsten as a protective liner. Controlled deposition of the tungsten was employed to give a textured surface for wicking. The working fluid used was sodium with the heat pipe closure accomplished by a tungsten-to-tungsten braze using a palladium-cobalt brazing alloy. These heat pipes were operated in air and in combustion gases at temperatures to about 1200 exp 0 K. Peak-measured heat transfer through a 2.0-cm-diam heat pipe was about 2 kW with operational limits estimated to be higher.After about 100 h of operation and 30 cold starts, one of these pipes was sectioned and the tungsten-SiC interface examined for evidence of deterioration or reaction. The reaction zone thickness was found to be in agreement with predictive models developed on the program. However, some evidence of liner shell bond deterioration was observed, prompting a continuing investigation of improved fabrication methods. (ERA citation 06:022418)

DOE/TIC-1022137 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
International Energy Conservation Month: An Assessment.
Nov 79, 24p

Interviews were conducted to examine the impact of campaign promotional efforts for International Energy Conservation Month (IECM) on individual awareness and attitudes towards energy conservation. The methodology, promotional efforts for IECM, organizational responses, and questionnaires are presented. Data are analyzed on attitude items. (ERA citation 06:022258)

DOE/TIC-11460 PC **A10**/MF **A01**
Brown Associates, Silver Spring, MD.
Sampling Variability for Redesign Buildings.
5 Jan 80, 216p

Estimates of the relative sampling variability of budget percentiles for building type HDD/CDD matrices are presented for small and large offices, elementary and secondary schools, clinics, gyms, community centers, theaters, stores, shopping centers, storage, nursing homes, hotels, motels, high- and low-rise apartments. (ERA citation 06:022199)

DOE/TIC-11462 PC **A05**/MF **A01**
Brown Associates, Silver Spring, MD.
Budget Percentiles for Baseline and Redesigned All Commercial Building Types Assuming No Cooling.
Jul 79, 84p

Estimates are presented of the budget percentiles for baseline buildings as well as redesign buildings. Estimates are given for a large number of combinations of heating degree days (Base 60 exp 0) and cooling degree days (Base 50 exp 0), derived from the HDD (base 65 exp 0) and CDD (Base 65 exp 0) combination for 226 places as given in the Climate Atlas of the US. Places in the Climate Atlas arranged alphabetically are listed in Table A. Table B is entitled: Places Listed in the Climate Atlas Listed by the Same CDD (Base 50) Intervals as Budget Percentile Tables. Tabulated budget percentiles are given on: small and large offices; elementary and secondary schools; hospitals; clinics; gyms; community centers; nursing homes; hotels/motels; theaters; stores; shopping centers;storage; and apartment buildings. (ERA citation 06:022201)

LA-UR-81-1039 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Performance Summary of the Balcomb Solar Home.
J. D. Balcomb, J. C. Hedstrom, and J. E. Perry, Jr. 1981, 6p CONF-810509-34
Contract W-7405-ENG-36
Annual conference of the International Solar Energy Society, Philadelphia, PA, USA, 26 May 1981.

The heating performance of the Balcomb passive solar home is re-evaluated based on detailed review of 85 channels of data taken during six weeks of 1980. This led to a re-analysis of 176 days of data taken over the winter of 1978-79. Auxiliary heat during this winter was 7.4 million Btu which compares with 66.0 million Btu total heat losses from the house plus 46.4 million Btu losses from the greenhouse. Auxiliary heat predicted using the solar load ratio method is 8.1 million Btu. Solar savings are estimated as 57 million Btu. Good thermal comfort conditions are documented. Energy flows are tabulated for each month. Energy flows are tabulated for each month. Conclusions regarding detailed heat flow and storage in the house are presented. (ERA citation 06:021862)

LA-UR-81-1084 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Magnetic Refrigeration for Spacecraft Systems.
J. A. Barclay. 1981, 9p CONF-810715-1
Contract W-7405-ENG-36
11. inter-society conference on environmental systems, San Francisco, CA, USA, 13 Jul 1981.

Magnetic refrigerators, i.e., those that use the magnetocaloric effect of a magnetic working material in a thermodynamic cycle, offer potentially reliable, and efficient refrigeration over a variety of temperature ranges and cooling powers. A descriptive analysis of magnetic refrigeration systems is performed with particular emphasis on more efficient infrared detector cooling. Three types of magnetic refrigerator designs are introduced to illustrate some of the possibilities. (ERA citation 06:022421)

LA-UR-81-1201 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Preliminary Market Potential Indexing Study of the United States for Direct Gain in New Single-Family Residential Construction.
W. M. Robson, and F. Roach. 1981, 6p CONF-810509-30
Contract W-7405-ENG-36
Annual conference of the International Solar Energy Society, Philadelphia, PA, USA, 26 May 1981.

The evaluation of the market potential for passive solar designs in residential new construction offers an attractive counterpart to the numerous market penetration assessments that have been performed over the last four years. Market penetration analyses have generally concerned themselves with the long run adoption of solar energy technologies, while Market Potential Indexing (MPI) addressed here examines the near-term attractiveness of solar. The MPI method is briefly reviewed, followed by specification of six attributes that may characterize the residential single-family new construction market. Raw attribute data for each of the six is presented for 220 regions within the United States. Attribute weighting functions are constructed from the perspective of consumers, producers or home builders, and the federal government. Preliminary results from these three perspectives are portrayed for a fixed sized direct gain design. (ERA citation 06:021746)

LA-UR-81-1559 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Custom Weighting-Factor Method for Thermal-Load Calculations in the DOE-2 Computer Program.
J. F. Kerrisk, B. D. Hunn, N. M. Schnurr, and J. E. Moore. 1981, 18p CONF-810657-1
Contract W-7405-ENG-36
ASHRAE 1981 annual meeting, Cincinnati, OH, USA, 28 Jun 1981.

A method of calculating weighting factors directly from input data describing a building has been added to DOE-2.1. These weighting factors, called

custom weighting factors, are specific to the building being analyzed. The basis for the custom weighting-factor method and its implementation in DOE-2.1 are described. The equations used to calculate the weighting factors are developed. Assumptions required for weighting factors in general, and miscellaneous assumptions and models employed in DOE-2.1 are also discussed. (ERA citation 06:023712)

LA-UR-81-1643 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Ceramic Heat Exchangers: Manufacturing Techniques and Performance.
M. A. Merrigan, and D. J. Sandstrom. 1981, 16p
CONF-810377-1
Contract W-7405-ENG-36
WESTEC conference, Boulder, CO, USA, 23 Mar 1981.

The objective of the ceramic heat pipe program being conducted at Los Alamos is demonstration of the practical feasibility of this technology for the solution of severe high temperature recuperation functions. Ceramic heat pipe recuperators have been theoretically shown to offer distinct advantages over conventional ceramic heat exchangers from the standpoint of efficiency of heat recuperation and economics. The main stumbling block to their widespread utilization is related to the problems of materials for construction and the details of fabrication and assembly. The performance objectives of ceramic heat pipes and some aspects of the materials technology program aimed at solving the problem of economic ceramic heat pipe fabrication are described. (ERA citation 06:022423)

LBL-12632 PC **A04**/MF **A01**
TRC Environmental Consultants, Inc., Wethersfield, CT.
Ventilation/Odor Study, Field Study. Final Report, Volume I.
R. A. Duffee, and P. Jann. Apr 81, 67p
Contract W-7405-ENG-48

The results are presented of field investigations in schools, hospitals, and an office building on the relation between ventilation rate and odor within the buildings. The primary objective of the study was to determine: the reduction in ventilation rates that could be achieved in public buildings without causing adverse effects on odor; the sources of odor in public buildings; and the identity of the odorants. The variables of particular interest include: type of odor, occupant density, odorant identity and concentration, differences in impressions between occupants adapted to prevailing conditions and visitors, and the influence of temperature and humidity on both the generation and perception of common contaminants. Sensory odor measurements, chemical measurements, fresh air ventilation measurements, and acceptability evaluations via questionnaires were made. Sensory odor levels were found to be quite low in most buildings tested. A three-to-five-fold reduction in the fresh air ventilation in schools, hospitals, and office buildings can be achieved without significantly affecting perceived odor intensities or detectability. Tobacco smoking was found to be the most significant, pervasive contributor to interior odor level. Total hydrocarbon content of indoor air varies directly with ventilation rates; odor, however, does not. The complete set of reduced data are contained in Volume II. (ERA citation 06:023714)

MCR-81-543 PC **A09**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
SOLPAS: Passive Solar Algorithms. User's Manual.
Mar 81, 189p
Contract AC01-78CS35243

This users' guide documents a library of passive solar heating subroutines that are compatible with the generalized MITAS thermal network analyzer. The objective of the SOLPAS activity has been to develop and document the essential routines needed to perform passive solar simulations with the existing MITAS program. Several example models are described that could be adapted easily to specific user applications. The following are included: SOLPAS basic structure, alphabetical listing of SOLPAS routines; selected MITAS subroutines, and SOLPAS examples. (ERA citation 06:021863)

MDC-G-8163A PC **A03**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Solar Repowering/Industrial Retrofit Systems Study Gulf Mt. Taylor Uranium Mill Solar Retrofit System Requirements Specification.
G. L. Keller. Dec 79, 40p
Contract AC03-79SF10608

The subsystem characteristics, design requirements, system environmental requirements, plant conceptual design data requirements for a Solar Industrial Retrofit Plant at the Gulf Mt. Taylor Uranium Mill are defined. For the purpose of the industrial retrofit conceptual design project, a retrofit system will consist of the following major elements: site, site facilities, collector subsystem, receiver subsystem, master control subsystem, fossil energy subsystem, energy storage subsystem (if applicable), process steam distribution subsystem, and specialized equipment. A limited functional description of the elements of these subsystems involved in the solar retrofit. (ERA citation 06:021864)

N81-26557/1 PC **A07**/MF **A01**
Ducat Investments, Inc., Kansas City, KS.
Solar Space Heating Installed at Kansas City, Kansas.
Final Report.
May 81, 135p NASA-CR-161763
Contract EG-77-A-01-4079

The solar energy system was constructed with the 48,800 square feet warehouse to heat the warehouse area of about 39,000 square feet while an auxiliary energy system heats the office area of about 9,800 square feet. The building is divided into 20 equal units, and each has its own solar system. The modular design permits the flexibility of combining multiple units to form offices or warehouses of various size floor areas as required by a tenant. Each unit has 20 collectors which are mounted in a single row. The collectors are double glazed flat plate collectors with a gross area of 7,800 sq ft. Air is heated either through the collectors or by the electric resistance duct coils. Extracts from the site files, specifications, drawings, installation, operation and maintenance instructions are presented.

PB81-215063 PC **A06**/MF **A01**
Tata Energy Research Inst., Bombay (India). Documentation Centre.
Solid Fuel Cooking Stoves.
Nov 80, 122p

This document is a survey of significant world literature on solid fuel cooking stoves. It provides a systematic presentation of all the known stove designs with suitable illustrations.

PB81-215089 PC **A03**/MF **A01**
Tata Energy Research Inst., Bombay (India). Documentation Centre.
Solid Fuel Cooking Stoves: International Directory.
Feb 81, 40p

Optimal design and promotion of the use of fuel efficient cooking stoves demand continued interaction and exchange of information between researchers, extension workers, policy makers and others concerned with stove projects. The directory is aimed at listing all the known organisations in this area.

PB81-217176 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Solar Energy Applications for Dwellings; Modelling and Simulation Part.
Final rept.,
Ove Jorgensen. 1980, 111p EUR-6681-1-EN
Prepared in cooperation with Technical Univ. of Denmark, Lyngby.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

A comparison of methods for predicting the performance of solar heating systems has been coordinated within the CEC Solar Energy R&D program. The methods which are developed within the EC countries are presented and compared in this report. The methods have been used to predict the performance of three different solar heating systems: a domestic hot water system, a pure house heating system and a combined system. Three different sets of weather data have been used: Carpentras, Hamburg and Ireland.

PB81-220386 Not available NTIS
National Bureau of Standards, Washington, DC.
Guidelines for Installation of Solar Components on Low-Sloped Roofs--A Summary.
Final rept.,
W. J. Rossiter, Jr., and R. G. Mathey. Apr 81, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proceedings of the NBS/NRCA Conference on Roofing Technology (6th) held at Gaithersburg, MD., on April 30-May 1, 1981, p58-62 1981.

This paper presents guidelines for installation of solar collectors and related equipment on low-sloped roofs of commercial, industrial, and multi-family type buildings. The guidelines are concerned primarily with the waterproofing integrity of the roofing system, access to the collectors and roofing, attachment of different types of collector support frames and roofing field surveys, and information from the literature, building codes, roofing field surveys, and acceptable roofing practice provided the basis for the guidelines. The guidelines include recommendations for design of the solar installation with regard to roofing performance, workmanship during collector installation, and maintenance of roofs with solar components.

PB81-222283 PC **A08**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Infrared and Catalytic Burner Technology Assessment.
Final rept. 21 Feb 80-20 Feb 81,
J. P. Kesselring, W. V. Krill, and R. J. Schreiber.
Feb 81, 163p FR-80-72/EE, GRI-80/0019
Contract GRI-5014-345-0283

The results of a review of the state of the art in infrared and catalytic burner development are presented. Four basic types of IR burners are currently is use. Eight commercial and/or residential appliances were characterized to assess the applicability of these burners. The refractory monolith tile and the fiber matrix burners appear most applicable for appliance use. Conceptual designs for the eight appliances with IR burners were prepared to evaluate the technical feasibility. These appliances are shown to have significant fuel efficiency increase and NOx and CO emission reduction benefits. Four appliances -- the commercial rangetop, deep fat fryer, commercial water heater, and warm air furnace -- also appear economically competitive, and recommended approaches for further development are presented. Lists of IR burner literature and patents are also included.

SAI-444-80-299-LJ PC **A06**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Cooling-and-Heating-Load Improvements in Seasonal-Performance Modeling of Room and Central Air Conditioners and Heat Pumps.
21 Mar 80, 104p
Contract AC03-79CS10757

The Seasonal Performance Model (SPM) has been developed to evaluate the seasonal cooling and heating performance of room air conditioners and central air conditioners and heat pumps. This model requires sizing the load to the product; the sizing is based on the Manual J procedure, with some minor modifications. The focus is on improving the product sizing technique of SPM by using a more realistic load estimate. A computer simulation program (SPMLD) was used to calculate the cooling and heating loads on an hourly basis. The results obtained indicate that a fairly good agreement exists between the hourly simulation (SPMLD) treatment and SPM treatment, when the following improvements are applied to the SPM model: a correction factor to the SPM infiltration rate for cooling load calculation, a correction factor to the SPM solar heat gain for cooling load calcula-

tion, shifting the zero load point from 65 exp 0 F to 60 exp 0 F outdoor temperature for heating load calculations. (ERA citation 06:022213)

SAND-81-7015 PC **A05**/MF **A01**
Shelltech Associates, Stanford, CA.
Stress Analysis for Spherically Curved Glass Reflectors.
C. R. Steele, N. Stephanou, M. Steele, and D. Nelson. Jun 81, 98p
Contract AC04-76DP00789

An analysis is given of the stresses that occur in elastically deformed, spherically curved glass mirrors for solar energy applications. Forming stresses, residual stresses, spring back deformation, and thermal stresses are analyzed. In addition, fracture mechanics and stress corrosion are discussed. Results are presented in generalized form for use in new designs. (ERA citation 06:023375)

SERI/TP-721-1197 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Reliability and Maintainability Program.
A. Eden. May 81, 4p CONF-810912-1
Contract AC02-77CH00178
Active contractors' review meeting, Washington, DC, USA, Sep 1981.

The program's goals are to accelerate the adoption of active solar energy systems in building applications by improving the reliability and maintainability of installed systems. The project is designed to accomplish this by providing the latest information; by assisting the industry in improving reliability and maintainability; by assisting in design, manufacture, installation and maintenance of reliable and durable systems; and by assisting in the development of codes and standards. Work and accomplishments in these areas are enumerated. (ERA citation 06:023267)

SOLAR/0005-81/80 PC **A04**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
National Solar Data Program Performance Results, Volume II.
1981, 72p
Contract AC01-79CS30027

Separate abstracts were prepared for the seven included papers on performance of solar heating systems. (ERA citation 06:021866)

SOLAR/1039-81/14 PC **A05**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Saddle Hill Trust Lot 73, Medway, Massachusetts: Solar Energy System Performance Evaluation, January 1980-December 1980.
M. L. Brauch. 1980, 81p
Contract AC01-79CS30027

The Saddle Hill Trust Lot 73 site is a single family residence in Medway, Massachusetts. The solar energy system is designed to supply 54% of the 18.70 million BTU hot water load. It is equipped with 45 square feet of solar collection area, an 80-gallon preheat storage tank, and a gas-fired, 40-gallon auxiliary domestic hot water tank. Problems with the data communication system and with a pyranometer are reported. Data are given describing the overall system performance energy savings, and solar energy utilization. Performance data are given for the collector, storage, and domestic hot water subsystems, as are the system operating energy and site weather conditions. Performance evalation techniques and sensor technology are briefly described. (ERA citation 06:021875)

13B. Civil Engineering

AD-A100 635/2 PC **A04**/MF **A01**
Rexnord, Inc., Milwaukee, WI. Environmental Research Center.
Design of a Test Kit for Determining Polyelectrolyte Dosages Prior to Direct Filtration,
Robert C. Scholz, and Mark L. Holcomb. Mar 81, 66p
Contract DAAK70-79-C-0124

The purpose of this study was to develop a test kit which could be used for on-site prediction of the polymer dosage required for direct filtrtion of water sources such as streams and rivers. Criteria established for the test kit are that it be simple, rugged, fast, repeatable, and compact. An ideal test kit would be one that could predict effluent turbidity, run length, and potential failures, besides optimum polymer dosage. The first test kits tried represented very simple and quick methods: pouring dosed influent through granular or paer media filters. Side-by-side tests using these test kits and the Army pilot multi-media filter showed that these techniques would not be suitable. A small scale multi-media test kit called an interface monitoring test kit, was successfully developed that approached the ideal test kit requirements. This test kit, which monitors effluent turbidity through coal mdeium, as well as through all the media under steady state conditions, appears to be the most promising test ket method because: It uses the identical filtration mechanisms as the full-scale filter. It sensitively and accurately predicts optimum polymer dosage and closely approximates the effluent turbidity of the full scale filter. It is a renewable test kit, i.e., backwashing allows it to be repeatedly reused requiring only small quantities of polymer for each test. It can be constructed and repaired, if necessary, from off-the-shelf components. The process design for the test kit is included in this report. It is recommended that a prototype test kit be constructed and tested on a variety of natural water courses.

AD-A100 660/0 PC **A03**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
Environmental Effects and Treatment Alternatives for Urea Runoff from Airfield De-Icing Operations.
Final rept. Jan 79-Jul 80,
Robert G. Blum. Aug 80, 40p Rept no. AFESC/ESL-TR-80-40

A literature review is presented which covers chemical transformation of urea, aquatic toxicity, nitrogeneous oxygen demand and entrophication. Several feasible control technologies for urea runoff are examined, including source control, land application, trickling filter, breakpoint chlorination, and ammonia stripping. (Author)

AD-A100 670/9 PC **A08**/MF **A01**
Williams (Charles W.) Inc., Alexandria, VA.
Offshore Installations and Their Relevance to the Coast Guard through the Next Twenty-Five Years. Volume I. Basic Report: Forecast of Offshore Installations and Their Implications to the Coast Guard.
Final rept. 21 Sep 79-17 Nov 80,
Kendall W. Simmons, William J. Burton, and Charles W. Williams. Nov 80, 157p USCG-D-23-81-VOL-1
Contract DOT-CG-916668-A
See also Volume 2, AD-A100 671.

This three-volume study forecasts the universe of offshore installations (OSI) in waters proximate to U.S. territory out of the year 2005, and assesses the impact of the growth in numbers and types of these installations on the Coast Guard. Volume I describes the global, regional, national, and subnational forces operating to promote or inhibit the growth of the OSI universe; presents a forecast of the OSI universe resulting from the impact of these forces; describes the likely impact of this growth on the Coast Guard; suggests a set of alternative strategies that appear feasible and promising for the Coast Guard; and offers recommendations for the Coast Guard. Volume II presents detailed forecasts of a variety of categories of offshore installations related to energy, food, minerals, industrial expansion seaward, military and space, transportation, and science and technology. Volume III contains appendices for each of the key chapters of Volume II; the data and rationale supporting the forecasts of Volume II are presented. The conclusions of the study are summarized: By the year 2005 the population of oil and gas OSI will have expanded very significantly; OTEC installations will be a distant second; all other types of OSI will be a still farther distant third. The expansion of the OSI universe will increase the operating load on the Coast Guard enormously by the year 2005; there will be a strong need for decision to either expand Coast Guard capability or to reduce Coast Guard load.

AD-A100 671/7 PC **A11**/MF **A01**
Williams (Charles W.) Inc., Alexandria, VA.
Offshore Installations and Their Relevance to the Coast Guard through the Next Twenty-Five Years. Volume II. Detailed Forecasts.
Final rept. 21 Sep 79-17 Nov 80,
Kendall W. Simmons, William J. Burton, and Charles W. Williams. Nov 80, 241p USCG-D-23-81-VOL-2
Contract DOT-CG-916668-A
See also Volume 3, AD-A100 672.

This three-volume study forecasts the universe of offshore installations (OSI) in waters proximate to U.S. territory out the year 2005, and assesses the impact of the growth in numbers and types of these installation on the Coast Guard. Volume II present detailed forecasts of a variety of categories of offshore installations related to energy, food, minerals, industrial expansion seaward, military and space, transportation, and science and technology. The conclusions of the study are summarized: By the year 2005 the population of oil and gas OSI will have expanded very significantly; OTEC installations will be a distant second; all other types of OSI will be a still farther distant third. The expansion of the OSI universe will increase the operating load on the Coast Guard enormously by the year 2005; there will be a strong need for decision to either expand Coast Guard capability or to reduce Coast Guard load. The study recommends that the Coast Guard opt to move in a direction that makes maximum use of its unique operational capability, if necessary at the expense of its regulatory and other nonoperational roles. (Author)

AD-A100 672/5 PC **A08**/MF **A01**
Williams (Charles W.) Inc., Alexandria, VA.
Offshore Installations and Their Relevance to the Coast Guard through the Next Twenty-Five Years. Volume III. Appendices.
Final rept. 21 Sep 79-17 Nov 80,
Kendall W. Simmons, William J. Burton, and Charles W. Williams. Nov 80, 153p USCG-D-23-81-VOL-3
Contract DOT-CG-91668-A
See also Volume 1, AD-A100 670.

This three-volume study forecasts the universe of offshore installations (OSI) in waters proximate to U.S. territory out the year 2005, and assesses the impact of the growth in numbers and types of these installation on the Coast Guard. Volume III contains appendices for each of the key chapters of Volume II; the data and rationale supporting the forecasts of Volume II are presented. The conclusions of the study are summarized: By the year 2005 the population of oil and gas OSI will have expanded very significantly; OTEC installations will be a distant second; all other types of OSI will be a still farther distant third. The expansion of the OSI universe will increase the operating load on the Coast Guard enormously by the year 2005; there will be a strong need for decision to either expand Coast Guard capability or to reduce Coast Guard load. The study recommends that the Coast Guard opt to move in a direction that makes maximum use of its unique operational capability, if necessary at the expense of its regulatory and other nonoperational roles. (Author)

AD-A100 676/6 PC **A06**/MF **A01**
Daedalean Associates, Inc., Woodbine, MD.
The Laboratory Application of a Nondestructive Evaluation Technique for Detecting Incipient Crack Formation in Model Offshore Structures.
Technical rept.,
Bruce Jachowski, David C. Fresch, Ray G. Brasfield, and A. P. Thiruvengadam. May 80, 103p Rept no. DAI-LLY-7763-003-TR
Contract N00014-77-C-0567

This report discusses the technical feasibility of applying an internal Friction Damping - Nondestructive Evaluation technique for offshore structures. The theory of internal friction damping is presented as it has been historically applied to various materials. The report then discusses the method-

ology for the application of internal friction damping. The experimental apparatus and specific laboratory technique as applied to a 1/14 scale model offshore structure is next discussed in detail. The experimental test results are related to the feasibility of employing the test technique as a device for detecting incipient cracking in offshore structures. The report includes discussion of specific conclusions and recommendations for further investigation of in-service offshore structures. (Author)

AD-A100 708/7 PC **A06**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Design Criteria Used in Contracts for Public Works.
May 81, 122p Rept no. NAVFAC-P-34
Supersedes report dated Feb 81, AD-A096 694 and all prior issues.

This publication presents a current listing of NAVFACENGCOM guide specifications and Federal, Military, and special specifications and standards cited in those guide specifications and the Design Manuals and related publications promulgated by NAVFACENGCOM as design criteria. Information on how and where to obtain the Government specifications and standards and other design criteria is provided.

AD-A100 734/3 PC **A13**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
User's Reference Manual: Computer Program for Design and Analysis of Inverted-T Retaining Walls and Floodwalls (TWDA).
Final rept.,
William A. Price, Robert L. Hall, H. Wayne Jones, Reed L. Mosher, and Michael E. George. Dec 80, 279p Rept no. WES-INSTRUCTION-K-80-7

Computer program TWDA (T-wall design/analysis) is a user-oriented conversationally interactive, modular time-sharing program system for computer-aided structural design of inverted-T retaining walls and floodwalls founded on earth or rock. Its essential characteristics include: (a) List-directed input with prompting available on request or as shown to be needed. Data lists may be entered interactively or in a data file. (b) Design for minimum cost including excavation, backfill, slab concrete, and stem concrete, with inputted unit costs. Default is to design for minimum concrete volume. (c) Multiple soils strata may be used as existing and/or backfill earth. Either Coulomb's equation or trail wedges may be used to get active earth pressures. (d) Multiple slopes may be used to model existing and/or finished grade surfaces. (e) Time-sharing printout is limited to the minimum needed by the user to make his design decisions. A full analysis report is available in an optional output file that may be listed on any terminal. (f) The program is structured to permit easy updating as criteria change. (g) Up to 10 load cases may be used. The user does not need to reenter any data by hand into subsequent runs. (h) The 1977 edition of ACI code 318 is used. Default procedures conform to the Corps of Engineers' Engineer Manuals in effect in 1980. The user may, however, direct the program to change many of the standard procedures as needed. (Author)

AD-A100 765/7 PC **A10**/MF **A01**
Gordian Associates, Inc., Washington, DC.
Trends in Navy Waste Reduction and Materials Markets.
Final rept. Jun 80-Feb 81.
Jun 81, 218p CEL-CR-81.014
Contract N68305-80-C-0064

A review of available information on current Navy solid wastes, national laws and policies and the application, demand and economics of using secondary materials recovered from solid waste. Quantitative conclusions for the Navy solid waste stream are based on statistical projections of the size of the Navy and per capita waste generation. While paper and packaging segments of the solid waste streams are emphasized, detailed presentations are made for each of the identified constituents of the waste stream with market projections for the secondary materials. National and Navy statistics are presented and projected through the 1980's time frame. An extensive bibliography on available information pertinent to the Navy solid waste stream is provided. (Author)

AD-A100 809/3 PC **A06**/MF **A01**
Corps of Engineers, Waltham, MA. New England Div.
Town Brook Local Protection, Massachusetts Coastal Streams: Feasibility Report for Water Resources Development. Volume I. Main Report.
Sep 80, 111p
See also Volume 2, AD-A100 810.

The Town Brook Feasibility study is of survey scope, undertaken for the purpose of recommending authorization or initiation of plans to solve water resource problems in the Town Brook watershed. The tasks of the study encompassed reviewing information from previous studies in the area and developing additional data and information to fill in the detail necessary to formulate a plan of improvement. The selection of the recommended plan was made after considering technical analyses and views of local interests and concerned agencies. (Author)

AD-A100 810/1 PC **A15**/MF **A01**
Corps of Engineers, Waltham, MA. New England Div.
Town Brook Local Protection, Massachusetts Coastal Streams: Feasibility Report for Water Resources Development. Volume II. Appendices.
Sep 80, 340p
See also Volume 1, AD-A100 809.

The report appendices encompass an assessment of economic and social aspects, a formulation of detailed plans, public views and responses, hydrology and hydraulics, geotechnical engineering, engineering design and cost estimates, recreation and natural resources, social and cultural resources, economic studies, and real estate studies. (Author)

AD-A100 833/3 PC **A08**/MF **A01**
Corps of Engineers, Buffalo, NY. Buffalo District.
Review of Reports on Lake Erie - Lake Ontario Waterway, New York. Appendix D. Economics.
Final rept.
Oct 73, 156p

The purpose of this review is to examine the conclusions from the environmental, engineering and economic studies of the construction of a water way between Lake Erie and Lake Ontario in the United States. This report will also serve as a basis for further action by Congress. (Author)

AD-A100 834/1 PC **A06**/MF **A01**
Sport Fishing Inst., Washington, DC.
Evaluation of Planning for Fish and Wildlife at Corps of Engineers Reservoirs, Beltzville Reservoir Project, Pennsylvania.
Interim rept.
Apr 81, 101p
Contract DACW31-79-C-0005

Beltzville Dam is located in Carbon County, Pennsylvania, on Pohopoco Creek, approximately 8.4 km (5.2mi) above its confluence with the Lehigh River. The primary project purposes for the 383 ha (947 ac) lake are flood control and water supply. The FWS originally indicated that federal acquisition of an area roughly equivalent to the flooded area, and opening of these lands to public hunting, would recover all project-associated wildlife losses. Later, the FWS indicated that mitigation of damages at Beltzville would require the intense management of 121 ha (300 ac) of project land at a cost of $5,600 for initial development and $2,200 O&M annually for a period of five years, for a total five-year cost of $16,600. The FWS further recommended licensing the 121 ha (300 ac) of project lands to the PGC for wild-life management purposes. these actions were considered necessary to replace the project-related projected loss of 200 man-days of hunting. The desired project lands were licensed to the PGC for wildlife management; however, development and operation have been totally at state expense. The prime planning aid relating to fishery resources was prepared by the PFC and FWS in 1964. Total angler-use of the project was predicted to average 33,000 man-days which appears reasonably accurate.

AD-A100 953/9 PC **A06**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Upgrading DA Trickling-Filter Sewage Treatment Plants.
Final rept.,
E. D. Smith, C. P. Poon, and R. D. Miller. May 81, 122p Rept no. CERL-TR-N-102

This report provides information, case histories, and design guidelines that will help Department of the Army (DA) personnel decide whether to use rotating biological contactors (RBCs) to upgrade their installations' trickling-filter sewage treatment plants. RBC technology is compared in terms of energy consumption, O&M requirements, efficiency, and reliability under various environmental and loading conditions. This report answers the questions most commonly asked about RBCs by DA personnel who must compare various upgrading alternatives. A stepwise approach has been provided to enable a more intelligent comparison of alternatives; this approach includes example calculations useful for estimating surface media, land, and energy requirements. Several independent studies were reviewed that have compared actual RBC performance data with the design claims of RBC manufacturers; discrepancies are pointed out and reasons offered for why the manufacturers' criteria should be accepted. Structural integrity problems (failure of media and/or shafts) have been documented for particular design vintage and certain proprietary RBCs. This report discusses these problems to ensure that DA personnel responsible for selection of pollution abatement technologies are aware of significant and provided to ensure that any selection of RBC technology by the Army is not plagued with medium/shaft failure incidents. (Author)

AD-A100 968/7 PC **A09**/MF **A01**
Dawkins (William P.), Stillwater, OK.
User's Guide: Computer Program for Design or Investigation of Orthogonal Culverts (CORTCUL).
Final rept.,
William P. Dawkins. Mar 81, 196p WES-INSTRUCTION-k-81-7
Contract DACW39-80-M-0334

This user's guide describes a computer program called 'CORTCUL' that can be used for design or investigation of orthogonal, reinforced concrete culverts by either working stress design (WSD) or strength design (SD) procedures. In the design mode, the program determines the required thicknesses and reinforcement areas for given soil loadings and culvert opening sizes. In the investigation mode, material stresses or factors of safety are calculated for specified structural geometries and loadings. The program was developed from specifications furnished by the Corps of Engineers' Computer-Aided Structural Engineering (CASE) Task Group on Culverts and Conduits. The program follows as a minimum the procedures outlined in Engineer Manual 1110-2-2902, 'Conduits, Culverts and Pipes,' dated 3 March 1969. (Author)

AD-A101 057/8 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Examination of Sample of Grout After 63 Years Exposure Underground.
Final rept.,
Jay E. Rhoderick. May 81, 13p Rept nos. WES/MP/SL-81-6, ONWI-248
Contract DE-AI97-81ET46633

During an investigation of the Troy Lock and Dam, New York, a core was recovered that contained part of a metal anchor that had been grouted into foundation rock. Since this grout was about 63 years old and had presumably been continuously below the water table, it provided an opportunity to study the effect of this environment for this period of time on the phase composition and microstructure of this grout. The phase composition of the grout was studied by X-ray diffraction; its microstructure was studied by scanning electron microscopy. It was found that the grout had a normal composition and microstructure; the environmental conditions had not had a significant effect on either composition or microstructure. The original water content had been fairly high as would be expected. (Author)

AD-A101 075/0 PC **A05**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Evaluation of Lands for Recreational Snowmobile Use (Guidelines for Natural Resources Management and Land Use Compatibility).
Final rept.,
Robert M. Lacey, R. S. Baran, W. D. Severinghaus, and D. J. Hunt. May 81, 80p Rept no. CERL-TR-N-105

This report describes a recommended method to evaluate land areas on Army installations for use by recreational snowmobiles. Personnel normally charged with land management responsibilities can perform this evaluation. The method includes recommended procedures to identify incompatible land uses, establish noise buffer zones, evaluate biological and terrain suitability, choose candidate areas or corridors, and establish trails. Factors considered in the evaluation method include user participation, existing trail systems, user demand, trial signing, vehicle operating conditions, and environmental assessment and monitoring. (Author)

AD-A101 158/4 PC **A04**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Parker Street Dam. (NJ00055), Atlantic Coastal Basin. North Branch of Forked River, Ocean County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. May 81, 72p DAEN/NAP-53842/NJ00055-81/05
Contract DACW61-79-C-0011
Prepared in cooperation with Harris-ECI Associates, Woodbridge, NJ.

Parker Street Dam is an earthfill dam with a paved roadway along the crest. The original embankment has been filled in on the downstream side to form a parking area for those swimming at the lake. There is a timber box spillway located approximately in the center of the dam. The overall condition of the dam is good. There are no signs of distress or instability in the dam. The hazard potential is rated as 'high'. Parker Street Dam is considered inadequate in view of its lack of spillway capacity to pass the SDF (1/2 PMF) without overtopping the dam. The spillway is capable of passing a flood equal to 8 percent of the PMF (16 percent of the 1/2 PMF), and is assessed as 'inadequate'. At present, the engineering data available is not sufficient to make a definitive statement on the stability of the dam, but based on the findings of the visual inspection, the preliminary assessment of static stability is that it is satisfactory. Actions are recommended along with a timetable for their completion.

AD-A101 159/2 PC **A05**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Lake Grinnel Dam (NJ00289). Wallkill River Basin, Tributary to Wallkill River. Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. Jul 81, 77p DAEN/NAP-53842/NJ00289-81/07
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineers, Florham, NJ.

Based on available records, past operational performance, visual inspection and Phase I engineering analysis, Lake Grinnel Dam is assessed as being in fair overall condition. Based on investigations of the downstream flood plain made in connection with this report, it is recommended that the hazard potential classification be downgraded from high to significant hazard. Hydraulic and hydrologic analyses indicate that the spillways are inadequate. Discharge capacity of the spillways is not sufficient to pass the designated spillway design flood (100-year storm) without an overtopping of the dam. The spillways are capable of passing approximately 1 percent of the SDF. Therefore, the owner should engage a professional engineer experienced in the design and construction of dams in the near future to perform more accurate hydraulic and hydrologic analyses relating to spillway capacity. Based on the findings of the analyses, the need for and type of remedial measures should be determined and then implemented. The owner should, in the near future, develop an emergency action plan together with an effective warning system outlining actions to be taken by the operator to minimize downstream effects of an emergency at the dam.

AD-A101 160/0 PC **A05**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Cooks Pond Dam, (NJ00810). Passaic River Basin. Tributary to Rockaway River. Morris County, New Jersey. Phase I Inspection Report.
Final rept. 15 Dec 80-12 Mar 81,
Richard J. McDermott, and John E. Gribbin. Jul 81, 85p DAEN/NAP-53842/NJ00810-81/07
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineers, Florham, NJ.

Based on available records, past operational performance, visual inspections and Phase I engineering analysis, Cooks Pond Dam is assessed as being in fair overall condition. Based on investigations of the downstream flood plain made in connection with this report, it is recommended that the hazard potential classification be downgraded from high to significant hazard. The spillway is capable of passing the designated spillway design flood (100-year storm) without an overtopping of the dam and, therefore, is assessed as being adequate. It is recommended that the following remedial measures be undertaken by the owner in the future: (1) The spillway discharge chamber and discharge channel should be cleaned of debris. (2) Soil on the downstream side of the embankment should be properly graded, compacted and stabilized. (3) Trees and adverse vegetation on the embankment should be removed. (4) Deteriorated stoplogs should be replaced. (5) Riprap on the upstream side of dam should be renovated. (6) The crest of dam should be properly stabilized.

AD-A101 174/1 PC **A04**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. N.J. No Name Dam Number 53 (NJ00809) Passaic River Basin, Tributary of Whippany River, Morris County, New Jersey. Phase I Inspection Report.
Final rept.
Mar 81, 64p DAEN/NAP-53842/NJ00809-81/03
Contract DACW61-79-C-0011
Prepared in cooperation with Langan Engineering Associates, Inc., Clifton, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A101 175/8 PC **A05**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Watchung Lake Dam (NJ00767), Raritan River Basin, Stony Brook, Somerset County, New Jersey Phase I Inspection Report.
Final rept.,
John P. Talerico. Jul 81, 81p DAEN/NAP-53842/NJ00767-81/07
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Harris ECI Associates, Woodbridge, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A101 176/6 PC **A05**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Kemah Lake Dam (NJ00268). Delaware River Basin . Tributary to Paulins Kill, Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. Jun 81, 97p DAEN/NAP-53842/NJ00268-81-06
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineers, Florham Park, NJ.

Hydraulic and hydrologic analyses indicate that the spillway is seriously inadequate. Discharge capacity of the spillway is not sufficient to pass the designated spillway design flood (SDF) without an overtopping of the dam, and dam failure would significantly increase the hazard downstream over that which would exist without dam failure. (The SDF for Kemah Lake Dam is equal to one-half the probable maximum flood.) The spillway is capable of passing approximately 11 percent of the probable maximum flood or 22 percent of the SDF. Therefore, the owner should engage a professional engineer experienced in the design and construction of dams in the near future to perform more accurate hydraulic and hydrologic analyses relating to spillway capacity. Based on the findings of the analyses, the need for and type of remedial measures should be determined and then implemented. The owner should, soon, develop an emergency action plan together with an effective warning system outlining actions to be taken by the operator to minimize downstream effects of an emergency at the dam.

AD-A101 177/4 PC **A05**/MF **A01**
New Jersey Dept. of Environmental Protection, Trenton.
National Dam Safety Program. Cherokee Lake Dam (NJ00785). Passaic River Basin, India Brook, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. May 81, 96p DAEN/NAP-53842/NJ00785-81-05
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineers, Florham, NJ.

Based on investigations of the downstream flood plain made in connection with this report, it is recommended that the hazard potential classification be downgraded from high to significant hazard. Hydraulic and hydrologic analyses indicate that the spillway is inadequate. Discharge from the spillway is not sufficient to pass the designated spillway design floor (100-year storm) without an overtopping of the dam. The spillway is capable of passing approximately 56 percent of the SDF. Therefore, the owner should engage a professional engineer experienced in the design and construction of dams in the near future to perform more accurate hydraulic and hydrologic analyses relating to the spillway capacity. Based on the findings of the analyses, the need for and type of remedial measures should be determined and then implemented. The owner should, in the near future, develop an emergency action plan together with an effective warning system outlining actions to be taken by the operator to minimize downstream effect of an emergency at the dam.

AD-A101 189/9 PC **A04**/MF **A01**
Corps of Engineers, Baltimore, MD. Baltimore District.
National Dam Inspection Program. Blue Giant Meadow Dam. (NDI ID Number-PA-00564 DER ID Number-40-80 Susuehanna River Basin, Tributary to Little Wapwallopen Creek, Luzerne County, Pennsylvania. Phase I Inspection Report.
Apr 81, 66p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The visual inspection and review of available design and construction information indicate that Blue Giant Meadow Dam is in poor condition. Deficiencies noted during the inspection included the poor condition of the spillway, eroded portions of the embankment crest, lack of any operable draw-

down facility, and heavy growth of trees and brush on the embankment. In accordance with the recommended guidelines the spillway design flood for this facility is in the range of the 100 year flood to 1/2 the PMF. Based on the size of the dam the selected SDF is the 100 year flood. The hydrologic and hydraulic computations indicate that the combination of reservoir storage and spillway discharge capacity cannot pass the Spillway Design Flood (100 year flood) without overtopping the dam. Therefore, in accordance with criteria outlined and evaluated in Section 5.5 of this report, the spillway for Blue Giant Meadow Dam is considered to be inadequate.

ANL/CNSV-TM-50 PC **A12**/MF **A01**
Argonne National Lab., IL.
Anaerobic Filters: An Energy Plus for Wastewater Treatment.
Jan 81, 273p CONF-800124-
Contract W-31-109-ENG-38
DOE workshop on anaerobic filters, Howey-in-the-Hills, FL, USA, 8 Jan 1980.

Separate abstracts are prepared for 12 papers presented at the seminar/workshop. One had previously appeared in the appropriate DOE data bases. (ERA citation 06:023760)

ANL/CNSV-TM-64 PC **A05**/MF **A01**
Argonne National Lab., IL.
Description of Emission Control Using Fluidized-Bed, Heat-Exchange Technology.
G. J. Vogel, and P. J. Grogan. Jun 80, 97p
Contract W-31-109-ENG-38

Environmental effects of fluidized-bed, waste-heat recovery technology are identified. The report focuses on a particular configuration of fluidized-bed, heat-exchange technology for a hypothetical industrial application. The application is a lead smelter where a fluidized-bed, waste-heat boiler (FBWHB) is used to control environmental pollutants and to produce steam for process use. Basic thermodynamic and kinetic information for the major sulfur dioxide (SO sub 2) and NO/sub x/ removal processes is presented and their application to fluidized-bed, waste heat recovery technology is discussed. Particulate control in fluidized-bed heat exchangers is also discussed. (ERA citation 06:023765)

CONF-800608-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Coal-Based Industrial-Fuels Assessment.
R. S. Bennett, H. J. Takach, W. H. Seward, R. S. Opalanko, and K. E. Wilzbach. 1980, 16p
Contract W-31-109-ENG-38
Air Pollution Control Association annual meeting, Montreal, Canada, Jun 1980.

This paper presents the results of a study to identify the economic, environmental, and energy impacts of possible New Source Performance Standards for industrial steam generators on potential use of coal and coal-derived fuels in such steam generators. In addition, the same impacts for distillate and residual fuel oils were identified for comparative purposes. This assessment will allow for substantive input to assist DOE in responding to the NSPS that will be proposed by EPA. This program utilized a systems-level approach where the industrial boiler and its fuel supply were considered from the standpoint of a potential industrial user. The system was composed of that combination of plants, facilities, and units that could take a clean, run-of-mine coal or refined fuel oil and produce a given quantity of heat input to a boiler, generating steam at a given pressure and temperature, while simultaneously generating steam at a given pressure and temperature, while simultaneously complying with the environmental standards selected for study. The most attractive applications of coal technology, based on the cost of steam produced, for industrial steam generators depends on boiler size, annual operating factor, and level of air emission controls applied. Under the Level-1 control scenario, direct combustion of low-sulfur coal is the most economical application of coal. Direct combustion of high-sulfur coal with wet flue-gas desulfurization is the least economical application under the same level of control for the technologies studied. About a dozen other specific conclusions are described briefly. (ERA citation 06:023413)

DE81023281 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Air Quality and the Environmental Effects from an Underground Coal-Gasification Test.
P. W. Seabaugh, R. E. Zielinski, A. K. Agarwal, J. W. Martin, and A. J. Liberatore. 1981, 9p MLM-2837(OP), CONF-810607-4
Contract AC04-76DP00053
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.
Microfiche only after original copies are exhausted.

In-situ coal gasification is a new technology currently under development by the United States Department of Energy (DOE). The Pricetown I field test is part of this continuing effort and was performed by DOE's Morgantown Energy Technology Center with Mound Facility providing the major instrumental and field crew support. The use of eastern bituminous coal resources with high sulfur content could be limited because of environmental regulations. Consequently an examination of the impact of sulfur containing and other possible gaseous components from the in-situ gasification on air quality is desirable from both a environmental and economical viewpoint. Using fast response analytical systems and real-time data acquisition a high density data base was acquired for 17 gaseous components of the product gas stream, including SO sub 2 , H sub 2 S, COS, and HCN. The data show that almost all gaseous sulfur from the bituminous coal was emitted as H sub 2 S. The SO sub 2 and COS values rarely exceeded the background of the instruments although the COS values did rise to about 100 ppM during the gasification phase. Except for one short period when values rose to 60 ppM, the HCN similarly stayed at the instrument background level of about 1 ppM. Because proven technology to clean H sub 2 S from gas streams is available, the Pricetown test indicates that in-situ gasification of high sulfur bituminous coal on a commercial scale should not contribute to deterioration in air quality. (ERA citation 06:023055)

DE81023290 PC **A07**/MF **A01**
Illinois State Water Survey Div., Champaign.
Study of Atmospheric-Pollution Scavenging. Nineteenth Progress Report.
R. G. Semonin, V. C. Bowersox, D. F. Gatz, M. E. Peden, and G. J. Stensland. May 81, 138p DOE/EV/01199-T1, COO-1199-63
Contract AS02-76EV01199
Microfiche only after original copies are exhausted.

The very dense Summer Chemistry of Rain Experiment (SCORE) network of samplers was used to analyze the spatial variablity of sulfate concentration and pH in convective precipitation. All available data from each site for the 1979 field experiment were included in the analysis. The sulfate values varied between 0.5 and 15 mg/L or by more than a factor of 30. The range of median values for the data set was 1.7 to 4.7 mg/L or a factor of 2.8. The range of pH values was 3.3 to 7.4 for all data, but for heavier rainfalls the range was 3.4 to 7.1. The median pH for all data was about 4.3. Fourteen pairs of aerosol samples were obtained to examine the reproducibility of sample collection and analysis. Good agreement was found for Si, S, K, Ca, Fe, and TSP and poorer agreement for Ti, Mn, Zn, Br, and Pb. However, statistical analyses reveals that the agreement is clearly less than desired. Some possible explanations for the discrepancies are offered, but additional experiments are needed to clarify this problem for addressing spatial variability problems. A comparison was carried out between an inverted funnel aerosol collection method and an isokinetic sampler free to move with the wind. The data shows that the isokinetic sampler collects more aerosol for the 11 elements analyzed and TSP than the inverted funnel. Statistical methods to estimate background lithium tracer experiments were used to help predict the deposition patterns. The evaluation of a newly designed sequential sampler for precipitation chemistry was carried out in a field experiment. (ERA citation 06:024123)

DE81023341 PC **A09**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Meteorology.
Environmental Measurements of Power Plant Cooling Tower and Stack Plumes. Final Report.
D. W. Thomson, R. G. de Pena, and J. A. Pena. 1981, 180p DOE/EV/02463-6
Contract AS02-76EV02463
Microfiche only after original copies are exhausted.

The focus of this program was to establish the reality and magnitude of any environmental changes caused by the plumes from large evaporative cooling towers through a comprehensive set of measurements taken from a research aircraft. Results are divided into three sections: (1) structure and dynamics of cooling tower plumes; (2) chemical transformation of SO sub 2 to sulfates in coal-fired power plant plumes; and (3) drift deposition studies. (ERA citation 06:023427)

DE81023667 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Risk Estimates of Impacts from Emerging Tar-Sand Technologies. Paper IAEA-SM-254/26.
J. I. Daniels, L. R. Anspaugh, Y. E. Ricker, and G. J. Rotariu. 11 Jun 81, 15p UCRL-85237(Rev.1), CONF-810652-3(Rev.1)
Contract W-7405-ENG-48
International symposium on health impacts of different sources of energy, Nashville, TN, USA, 22 Jun 1981.
Microfiche only after original copies are exhausted.

The risk of occurrence of significant unfavorable environmental, health, and safety impacts associated with tar-sand technologies have been estimated. These estimates were made from information related to typical emerging surface (above ground) and in situ (underground) tar-sand oil-recovery processes. Both types of processes are being developed for use on tar-sand deposits in the US and may also be applicable to deposits in other countries. The levels of pollutant emissions affecting land, air, and water were determined from data related to current US field experiments involving surface processes (including retort and solvent extraction methods), and in situ techniques (including combustion and steam-injection methods). Next, these data were extrapolated to determine pollutant levels expected from conceptual commercial facilities producing 20,000 bbl/d. These estimates predict the nature and magnitude of environmental, health, and safety impacts. The likelihood-of-occurrence of these impacts was then assessed. Experience from other industries, including information concerning health and ecosystem damage from air pollutants, measurements of ground-water transport of organic pollutants, and the effectiveness of environmental-control-technologies, was used to make this assessment. It was concluded from this assessment that certain adverse effects are more likely to occur than others. These effects can be ordered for surface and in situ technologies according to their likelihood-of-occurrence. Occupational health problems including those related to worker exposure to carcinogenic and other hazardous substances are likely to occur during surface extraction. Public health and ecosystem effects may occur from both technologies but will be localized and/or controllable. (ERA citation 06:023155)

DE81023757 PC **A02**/MF **A01**
Ames Lab., IA.
Development of Alkali and Trace Heavy-Metal Monitors for Coal-Conversion-Process Streams.
W. J. Haas, Jr., D. E. Eckels, R. N. Kniseley, and V. A. Fassel. 1981, 23p IS-M-327, CONF-810249-2
Contract W-7405-EN-82
DOE hot gas cleanup contractor's meeting, Morgantown, WV, USA, 3 Feb 1981.
Microfiche only after original copies are exhausted.

The Morgantown Energy Technology Center (METC) is involved in the development of processes and equipment for the production of low-Btu gas from coal and for the fluidized bed combustion of coal. The ultimate objective is the large scale production of electricity using high temperature gas turbines. Such turbines, however, are susceptible to drastically accelerated corrosion and self-destruction when relatively low concentrations of sodium and potassium are present in the driving gas streams. Knowledge and control of the con-

centrations of those elements, at part per billion levels, are critical to the success of both the gas cleanup procedures that are being investigated and the overall energy conversion processes. This report describes instrumentation and procedures developed for application to the problems outlined above and results that have been obtained. The Ames instruments, which feature an automated, dual channel flame atomic emission spectrometer, perform the sodium and potassium determinations simultaneously repetitively, and automatically every two to three minutes by atomizing and exciting a fraction of the subject gas sample stream in either an oxyhydrogen flame or a nitrous oxide-acetylene flame. The analytical results are printed and can be transmitted simultaneously to a process control center. Work on the development of instruments for sequential and simultaneous on-line determination of many other elements that may impact the economics, process chemistry, and/or environmental acceptability of proposed coal conversion/gas cleanup processes will also be outlined. The latter instruments are based on inductively coupled plasma excitation of the sample streams. (ERA citation 06:023032)

DE81024050 PC **A04**/MF **A01**
Aerospace Corp., Germantown, MD.
Coal-Fired Power Plant (Eastern Coal): Environmental Characterization Information Report.
Jan 81, 69p DOE/EP-0013
Contract AT03-76EV74010
Microfiche only after original copies are exhausted.

This Environmental Characterization Information Report (ECIR) for Coal-Fired Power Plants (Eastern Coal) has been prepared from the latest available environmental and technical information collected from a number of sources. The typical plant chosen for characterization is a 500-MWe nameplate rating pulverized-coal plant with an electrostatic precipitator, wet scrubber, and a wet-mechanical-draft cooling tower. It is a mine-mouth facility, with its own coal preparation plant. The process, plant operating parameters, resources needed, and the environmental residuals and products associated with the power plant are presented. Annual resource usage and pollutant discharges are shown in English and metric units, assuming an annual plant capacity factor of 80%. While this capacity factor is representative of the reliability of generating units of this size, it does not consider unscheduled shutdowns for repairs of the plant and associated environmental control equipment or factors independent of the plant itself, e.g., reserve requirements. (ERA citation 06:023426)

DE81024267 PC **A11**/MF **A01**
GCA Corp., Bedford, MA.
Acid Rain Information Book. Final Report.
May 81, 235p DOE/EP-0018
Contract AC01-79EV10273
Microfiche only after original copies are exhausted.

Acid rain is one of the most widely publicized environmental issues of the day. The potential consequences of increasingly widespread acid rain demand that this phenomenon be carefully evaluated. Review of the literature shows a rapidly growing body of knowledge, but also reveals major gaps in understanding that need to be narrowed. This document discusses major aspects of the acid rain phenomenon, points out areas of uncertainty, and summarizes current and projected research by responsible government agencies and other concerned organizations. (ERA citation 06:024122)

DOE/CS/20100-T2 PC **A05**/MF **A01**
Systems Technology Corp., Xenia, OH.
Evaluation of Mixing Systems for Biogasification of Municipal Solid Waste.
J. T. Swartzbaugh, and R. B. Smith. 79p
Contract AC05-76CS20100

Two specially selected mixing systems were tested and evaluated to determine how effectively they could prevent the formation of fibrous mats and stringers during the anaerobic digestion of a slurried mixture of preprocessed municipal slide waste and sewage sludge to produce methane gas. The tests were conducted in a modified 10.7 m (35 ft) diameter, nominal 378,000 liter (100,000 gal) capacity concrete vessel in the Franklin, Ohio, environmental complex. This complex included two plants that collectively provided the solid waste/sewage sludge feedstock. One of the two mixing systems was a mechanical agitator--a vessel-centered rotary shaft with four blades at each of two levels to drive the slurry downward. The second system included three equidistantly placed gas gun assemblies that each produced bubbles at a constant rate to draw the slurry upward. The solids accumulations were generally the same for the two mixing systems when they had common test conditions. In all tests, the percent solids for the top level were higher than those for the middle and bottom levels. As the feed ratio and the percent solids in the feedstock were increased, this differential became progressively more pronounced. Moreover, the percent of volatile solids (in a given amount of total solids) for the top level became disproportionately higher than those for the other two levels. (ERA citation 06:022256)

DOE/MC/08004-T8 PC **A02**/MF **A01**
Illinois State Geological Survey, Urbana.
Determination of Valuable Metals in Liquefaction-Process Residues, Report No. 45. Quarterly Technical Progress Report, January 1, 1979-March 31, 1979.
R. R. Ruch, S. J. Russell, R. Malhotra, R. A. Cahill, and J. K. Frost. 19 Apr 79, 14p
Contract AC21-76MC08004

Included in the list of US imports in 1974 are metals for which a substantial quantity of reserves within the US have been identified; however, in most cases extraction of these metals would involve higher costs than imported prices. The 33 elements for which over 25% of the total US need was met through imports in 1974 include: Pd, Hf, Pt, Ni, Sb, I, Hg, Th, Al, F, Sr, Tl, Cr, Sn, Bi, W, Co, Ta, Ag, In, Mn, Cd, Zn, Te, Ge, Ti, Au, Se, Ba, Sc, As, Fe, and V. A comparison of this list with elements found in the coal liquefaction residue shows that with the exception of I, Hg, F, Te, and Se, all the 28 other elements are present in the coal liquefaction residues in varying concentrations. Their economic significance will depend not only upon the demand-supply factors but also upon the feasibility of their recovery, both technical and economical. To further determine metals of economic value, the second criteria used is the projected growth in demand. An examination of the US Bureau of Mines Projections shows that there are 30 elements for which the demand by the year 2000 would more than double. The demand for two elements - thorium and cesium - is projected to increase by more than 1000% by the year 2000. In addition there are four elements for which the demand is projected to increase more than 200% between 1974 and 2000. These include uranium, hydrogen, beryllium and gallium. The other elements for which demand is projected to increase by more than 100% inluded: V, Au, O, Cl, Se, Al, B, Li, W, Zr, Br, F, Mg, Mo, Sb, Hf, Ti, I, Ta, N, Cu, S, Zn and Cd. With the demand for these elements projected to increase dramatically over the next two decades, procurement of some of these elements could become difficult. All but Cl, Se, Br, F, I, N, and S are present in varying concentrations in the liquefaction residues. (ERA citation 06:021538)

DOE/MC/16230-154 PC **A07**/MF **A01**
Pope, Evans, and Robbins, Inc., New York.
Rivesville Multicell Fluidized-Bed Boiler. Annual Technical Progress Report, July 1979-June 1980.
1980, 133p
Contract AC21-81MC16230

Design, construction and test program of a 300,000 lb/hr steam generating capacity multicell fluidized bed bouler (MFB), as a pollution free method of burning high-sulfur or highly corrosive coals, is being carried out. The concept involves burning fuels such as coal, in a fluidized bed of limestone particles that react with the sulfur compounds formed during combustion to reduce air pollution. Nitrogen oxide emissions are also reduced at the lower combustion temperatures. The CaSO sub 4 produced in the furnace is discharged with the ash or regenerated to CaO for reuse in the fluidized bed. This report presents information on continued operation of the Rivesville MFB steam generating plant in a commercial mode and for determining performance and emission characteristics; studies and tests on flyash characterization and reinjection, fuel feed educators and needles, air distributor, corrosion-erosion and sulfur capture; engineering studies to improve MFB performance and reliability. (ERA citation 06:022460)

DOE/PR/50171-T1 PC **A06**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Comparison of Alternative Approaches for Estimation of Particulate Concentrations Resulting from Coal Strip Mining Activities in Northeastern Wyoming.
Oct 79, 119p
Contract AC01-76PR50171

This study was undertaken for the Department of Energy (DOE) to compare several alternative approaches to the estimation of particulate concentrations resulting from strip mining. The four alternative approaches for quantifying particulate emissions are: the exclusion of fugitive dust emissions; the consideration of only the respirable particulates emitted by mining activities; the consideration of only the inhalable particulates emitted by mining activities; the inclusion of all sources of particulates within the mining cycle by which soil and coal are removed, stored, or transported. For assessment purposes, these four alternatives were applied to the expected level of mining activity (existing and proposed) in the Anderson-Wyodak coal field in 1985. Regional air quality modeling analyses were performed using the most recently developed emission factors and a simple particle deposition scheme. Based on the results of the modeling analyses, relative costs, production constraints, and uncertainties associated with each emission alternative were determined. In general, the conclusions of this study are as follows: potential air quality impacts which may result from the operations of a surface coal mine are, to a large degree, dependent on the analytical approaches selected; there are substantial uncertainties associated with the methods and techniques used to analyze fugitive dust sources; and even using the most up-to-date techniques, two of the alternative approaches predicted concentrations which may exceed federal and state ambient air quality standards, which in turn may constrain future coal production in this region or others with high density mining operations. (ERA citation 06:023054)

EPRI-EA-1913 PC **A13**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Emissions Inventory for the SURE Region. Final Report.
H. A. Klemm, and R. J. Brennan. Apr 81, 293p

One purpose of the Sulfate Regional Experiment (SURE) program is to define the mechanisms that link emissions to ambient concentrations of sulfur dioxide and sulfates and subsequently develop a useful air quality model that relates emissions to ambient concentrations. Described in this report is the phase of the SURE program involved with the development of a detailed emissions inventory. Inventories were prepared for all man-made stationary sources of emissions and surface transportation emissions. Variations in emissions by season, from weekday to weekend, and for eight 3-hour periods throughout the day were reported. Estimates of emissions of sulfur dioxide, sulfate,particulate matter, nitrogen monoxide, nitrogen dioxide, and three classes of hydrocarbons were prepared. Inventories of sulfur dioxide and sulfate emissions from electric utility sources in the region were prepared for August and October 1977, January 10 to February 9, 1978, April 3 to May 2, 1978, and July 1978. Hourly variations on a point-by-point basis were reported. Relationships between emission rates and external factors that influence those rates were investigated for different source types. Finally, a detailed analysis of the accuracy of the emissions was performed. A unique feature of this inventory was the acquisition of hourly SO sub 2 emission rates from electric power plants during those months when the SURE intensive measurements were conducted. This detailed data base, along with the longer term emissions estimates, showed that total SO sub 2 emissions over the SURE region varied by no more than 15%. It was found that fossil-fueled power plants emit between 50 and 60% of the SO sub 2 , depending on

the season, and approximately 30% of the NO. Approximately 80% of the pollutants emitted from power plants are confined within the lower 300m (1000 ft.) of the atmosphere, i.e., the bulk of these pollutants is confined within the mixed layer. (ERA citation 06:022545)

LA-8773-SR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Leaching Experiments on Coal Preparation Wastes: Comparisons of the EPA Extraction Procedure with Other Methods.
R. C. Heaton, P. L. Wanek, E. F. Thode, E. J. Cokal, and P. Wagner. Apr 81, 25p
Contract W-7405-ENG-36

Mineral wastes from seven coal preparation plants, located in the Illinois Basin, the Appalachian Region, and the West have been leached in accordance with the EPA extraction procedure published in the Federal Register dated May 19, 1980. This is one of the tests required for the classification of solid wastes under RCRA. When examined according to the procedures set forth in the Federal Register, all of the coal waste leachates had trace element concentrations below the the maximum set by EPA. Results of the EPA leaching procedure compare favorably with those of our own leaching experiments for those elements which were analyzed (Ag, As, Ba, Cd, Cr, Hg, Pb, Se). However, we note that coal wastes release substantial quantities of other trace elements not included in the protocols at the present time (Fe, Al, Ni, Mn, Zn, Cu). In addition, the requirement that the test leachage be maintained at pH less than or equal to 5 has the effect of establishing an abnormal environment for those wastes that are neutral or alkaline. (ERA citation 06:023049)

LBL-12128 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Influence of Fuel Sulfur on the Selective Reduction of NO by NH sub 3.
D. Lucas, and N. J. Brown. Jan 81, 8p CONF-810704-2
Contract W-7405-ENG-48
International specialists meeting of the Combustion Institute, Bordequx, France, 20 Jul 1981.

More intensive regulations of the emissions of nitrogen oxides from stationary combustion sources have prompted the innovation and characterization of new control technologies suitable for applications in utilities. One of the more recent and attractive abatement technologies is the Thermal DeNO/sub x/ process which has been described by Lyon and Longwell. This process removes NO by selectively reducing it with NH sub 3 added to the post-combustion gases containing excess oxygen. This process is thus independent of the NO formation mechanism and makes no distinction between thermal and fuel NO. The present study is concerned with characterizing the selective reduction process for light distillate oil fuel admixed with variable amounts of pyridene and thiophene in a laboratory scale combustion tunnel under a variety of experimental conditions. This paper reports on those aspects of the study concerned with the investigation of possible synergistic effects between the sulfur and selective reduction chemistry. (ERA citation 06:021596)

N81-26594/4 PC **A05**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Geophysical Sciences.
Data Reduction Analysis and Application Technique Development for Atmospheric Trace Gas Constituents Derived from Remote Sensors on Satellite or Airborne Platforms.
Final Report, period ending 30 Jun. 1980.
J. C. Casas, and S. A. Campbell. May 81, 87p NASA-CR-164478, GSTR-81-7
Grant NSG-1395

The applicability of the gas filter correlation radiometer (GFCR) to the measurement of tropospheric carbon monoxide gas was investigated. An assessment of the GFRC measurement system to a regional measurement program was conducted through extensive aircraft flight-testing of several versions of the GFRC. Investigative work in the following areas is described: flight test planning and coordination, acquisition of verifying CO measurements, determination and acquisition of supporting meteorological data requirements, and development of supporting computational software.

PAT-APPL-6-238 191 PC **A03**/MF **A01**
Department of the Interior, Washington, DC.
A System for Maintaining High Resonance during Sonic Agglomeration.
Patent Application,
James E. Dudgeon, and Donald A. Stanley. Filed 25 Feb 81, 36p PB81-222671
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to the control of fine particulate by sonic agglomeration and more particularly to a system for maintaining high resonance during the sonic agglomeration of the particulate.

PATENT-4 231 771
Not available NTIS
Department of Energy, Washington, DC.
Dispersoid Separation Method and Apparatus.
Patent,
W. E. Winsche. Filed 28 Apr 78, patented 4 Nov 80, 7p PAT-APPL-901 047
Supersedes PAT-APPL-901 047-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Improved separation of heavier material from a dispersoid of gas and heavier material entrained therein is taught by the method of this invention which advantageously uses apparatus embodied in an inertial separator having rotary partition means comprising wall members dividing a housing into a plurality of axially-extending through passages arranged in parallel. Simultaneously with the helical transit of a moving stream of the dispersoid through the parallel arrangement of axially-extending through passages at a constant angular velocity, the heavier material is driven radially to the collecting surfaces of the rotational wall members where it is collected while the wall members are rotating at the same angular velocity as the moving stream. The plurality of wall members not only provides an increased area of collecting surfaces but the positioning of each of the wall members according to the teaching of this invention also results in a shortened time-of-flight to the collecting surfaces. (ERA citation 06:023050)

PB81-196537 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Office of Evaluations and Safety Objectives.
Safety Effectiveness Evaluation--The Improvement of Nighttime Conspicuity of Railroad Trains.
Safety rept.
3 Apr 81, 49p NTSB-SEE-81-3
Color illustrations reproduced in black and white.

The National Transportation Safety Board examined nighttime accidents in which highway vehicles strike trains that block grade crossings. There is adequate evidence to suggest that this type of accident is strongly influenced by motorists' inability to perceive the presence of trains in crossings because trains lack conspicuity within their environment. This type of accident results each year in approximately 1,800 collisions with 140 persons killed and 800 injured. The Safety Board reviewed pertinent research undertaken by the Federal Railroad Administration (FRA) on a known countermeasure--reflectorization. The Safety Board issued recommendations to the FRA to develop and issue an advance notice of proposed rulemaking within 6 months for the improvement of nighttime train car and locomotive visibility at grade crossings to aid in preventing accidents in which motor vehicles run into the sides of trains at night. Additionally, the Board recommended that the FRA cooperate with the Federal Highway Administration, the National Committee on Uniform Traffic Control Devices, and the Association of American Railroads to plan and institute a research program on criteria for the use of reflectorization devices and materials.

PB81-212037 PC **A12**/MF **A01**
Pacific Environmental Services, Inc., Elmhurst, IL.
Industrial Process Fugitive Emissions Inventory for the Region V Great Lakes Shoreline.
Final rept.,
Charles Mackus, and Eddy Lin. 1980, 261p
Contract EPA-68-01-4140

This report was the result of a limited-scope preliminary study of particulate fugitive emissions from major industrial sources located within the six states of U.S. EPA Region V. This study revealed that approximately 229,000 to 531,000 tons of fugitive particulates were deposited into the Great Lakes during 1978. Large industrial cities such as Chicago, Gary, Cleveland, Toledo, Detroit, and Milwaukee were found to have the largest concentration of major fugitive emission sources. Iron and steel industries were found to be the largest fugitive emission sources bordering the lakes.

PB81-212433 PC **A09**/MF **A01**
SYSTAN, Inc., Los Altos, CA.
Evaluation of the Rochester, New York Community Transit Service Demonstration-Volume II: Evaluation Report.
Final rept. Nov 77-Mar 80,
Debra A. Newman, and Michael Holoszyc. Oct 80, 178p SYSTAN-D161-7, UMTA-NY-06-0048-81-2
Contract DOT-TSC-1416

The primary purpose of the Rochester Community Transit Demonstration was to test a strategy for providing cost-effective demand-responsive transit service in suburban areas. Services were planned to have sufficiently low operating costs so that the communities could afford to continue these services after the demonstration. Cost-effectiveness was sought by encouraging close community involvement, using small vehicles, and inviting competitive bidding for new paratransit service operations. The demonstration project was an outgrowth of the Rochester Integrated Transit Demonstration, which took place between April 1975 and October 1977. In the new demonstration, both public and private operators provided Dial-A-Ride and handicapped services, and their performances were compared. The demonstration also included a unique funding strategy that shifted responsibility to the local towns served by Dial-A-Ride vehicles. This report evaluates the results of the demonstration, which includes the implementation process, the level of service provided to users, the demand response, and the services' operating efficiency. The implications of the Rochester experience are summarized for the benefit of other localities interested in implementing similar services. An epilogue section, documenting activities that have occurred since the demonstration ended is also included.

PB81-212441 PC **A04**/MF **A01**
SYSTAN, Inc., Los Altos, CA.
Evaluation of the Rochester, New York Community Transit Service Demonstration-Volume III: Appendices.
Final rept., Nov 77-Mar 80,
Debra A. Newman, and Michael Holoszyc. Oct 80, 69p SYSTAN-D161-7, UMTA-NY-06-0048-81-3
Contract DOT-TSC-1416

The primary purpose of the Rochester Community Transit Demonstration was to test a strategy for providing cost-effective demand-responsive transit service in suburban areas. Services were planned to have sufficiently low operating costs so that the communities could afford to continue these services after the demonstration. Cost-effectiveness was sought by encouraging close community involvement, using small vehicles, and inviting competitive bidding for new paratransit service operations. The demonstration project was an outgrowth of the Rochester Integrated Transit Demonstration, which took place between April 1975 and October 1977. In the new demonstration, both public and private operators provided Dial-A-Ride and handicapped services, and their performances were compared. The demonstration also included a unique funding strategy that shifted responsibility to the local towns served by Dial-A-Ride vehicles. This report, Volume II, contains the technical appendices, which include operating records, surveys, survey results, and promotional materials.

PB81-213357 PC **A08**/MF **A01**
Stanford Univ., CA. Dept. of Civil Engineering.
Chlorine Dioxide for Wastewater Disinfection: A Feasibility Evaluation.
Final rept. Sep 77-Jun 80,
Paul V. Roberts, E. Marco Aieta, James D. Berg, and Bruce M. Chow. Jun 81, 159p EPA-600/2-81-092
Grant EPA-R-805426

Chlorine dioxide was compared with chlorine for the disinfection of wastewater in laboratory experiments. Disinfection with chlorine dioxide was also demonstrated at a full-scale wastewater treatment plant. Criteria for comparison included coliform kill, inactivation of poliovirus and other indicators, and formation of halogenated organic by-products. In general, chlorine dioxide accomplished a given fractional kill of total coliforms with a smaller product (residual x time) than chlorine. The required mass doses of the disinfectants were approximately equal for treating conventional activated-sludge effluent. The required dose of chlorine was approximately 2 to 10 times greater than that of chlorine dioxide for treating filtered, nitrified effluent, depending on the coliform standard. Chlorine dioxide was found to be more effective for inactivating Polio-virus I and natural populations of coliphage in both non-nitrified and filtered, nitrified wastewater effluents. Chlorine dioxide treatment formed no measurable amounts of trihalomethane by-products, whereas chlorine treatment formed 0.5 to 5 micro Mol per liter of trihalomethanes, chiefly chloroform, in experiments using wastewater effluents. Based on a total coliform standard of 1000 per 100 ml disinfection with chlorine is estimated to cost 0.3 to 1.7 cents per cu m (1.1 to 6.4 cents per 1000 gallons), depending on plant size, compared with 1.5 to 3.5 cents per cu m (5.8 to 13.4 cents per 1000 gallons) for disinfection with chlorine dioxide (1979 price levels).

PB81-213704 PC **A07**/MF **A01**
Texas Transportation Inst., College Station.
Field Tests and New Design Procedure for Laterally Loaded Drilled Shafts in Clay.
Final rept. Sep 76-Aug 80,
Mark W. Bierschwale, Harry M. Coyle, and Richard E. Bartoskewitz. Jan 81, 131p TTI-2-5-77-211-3F, FHWA/TX-81/09-211-3F
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

Lateral load tests were conducted on three drilled shafts in predominantly CH soil. Shaft sizes varied from 30 in. (760 mm) to 36 in. (910 mm) in diameter and 15 ft. (4.6 m) to 20 ft. (6.1 m) in length. Loads were applied incrementally at a point 2.6 ft. (790 mm) above the ground surface. Duration of the tests was 57, 24 and 205 days. Measurements of lateral earth pressure at various points along the length of the shaft, displacement near the ground surface, and rotation in the plane of loading were obtained for each increment of load. Additional data on five shafts tested under similar conditions were obtained from the literature. Based upon an analysis of the test data, the ultimate lateral load capacity of a rigid shaft was defined as the load required to produce a shaft rotation of 2 degrees. This definition was used to obtain an empirical correlation of rotation with lateral load. A correlation of the coefficient of ultimate resistance at the groundline, Np, with soil shear strength was also made. A design procedure utilizing the two correlations was developed. Several analytical methods described in the literature were used to calculate the capacity of the eight test shafts. The results were compared with computed capacities obtained by use of the design procedure developed for this research study.

PB81-213795 PC **A02**/MF **A01**
Office of Radiation Programs-Las Vegas Facility, NV.
Airborne Radiological Sampling of Mount St. Helens Plumes,
Vernon E. Andrews. Apr 81, 20p ORP-LVF-81-2

Particulate and gaseous samples for radiologial analyses were collected from the plumes created by eruptions of Mount St. Helens. The sampling aircraft and equipment used are routinely employed in aerial radiological surveillance at the Nevada Test Site by the Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada. An initial sample set was collected on April 4, 1980, during the period of recurring minor eruptions. Samples were collected again on May 19 and 20 following the major eruption of May 18. The Environmental Protection Agency's Office of Radiation Programs analyzed the samples for uranium and thorium isotopes, radium-226, lead-210, polonium-210, and radon-222. Other laboratories analyzed samples to determine particle size distribution and elemental composition. The only samples containing radioactivity above normal ambient levels were collected on May 20. Polonium-210 concentrations in the plume, determined from a sample collected between 5 and 30 km from the crater, were approximately an order of magnitude above background. Radon-222 concentrations in samples collected from the plume centerline at a distance of 15 km averaged approximately four times the average surface concentrations. The small increases in radioactivity would cause no observable adverse health effects.

PB81-214017 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
State Transit-Management Assistance to Local Communities.
Final rept.
Dec 80, 44p TRB/NCHRP/SYN-74, ISBN-0-309-03154-0
Library of Congress Catalog card no. 81-50520. Also pub. as ISSN-0547-5570. Sponsored in part by Federal Highway Administration and American Association of State Highway and Transportation Officials. Report on National Cooperative Highway Research Program, Synthesis of Highway Practice.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

An increasing number of states now provide technical assistance to managers of local passenger transportation. This assistance may take the form of financial aid, information exchange, or aid in the management of finances, personnel, operations, maintenance, and marketing. This report of the Transportation Research Board documents these activities, identifies practices that appear to have been successful, and recommends a comprehensive state-aid program including the donation of technical aid or staff time to local transit managers.

PB81-214033 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Parking,
John F. DiRenzo, Bart Cima, Edward Barber, Wayne Berman, and Marie L. Olsson. 1980, 50p TRB/TRR-786, ISBN-0-309-03200-8
Library of Congress catalog card number 81-9573. Also pub. as ISSN-0361-1981
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

The 7 papers in this report deal with the following areas: overview of implemented parking management tactics; impact on commuters of a residential parking-permit program in Alexandria, Virginia; land use zoning as transportation regulation; parking management study for Lancaster, Pennsylvania (Abridgment); impacts of municipal parking-fee increases in downtown Chicago; employer-subsidized parking and work-trip mode choice; maintenance of park-and-ride facilities in New Jersey.

PB81-214447 PC **A03**/MF **A01**
Foras Forbartha, Dublin (Ireland).
Refuse Disposal: Recovery Potential for Local Authorities,
C. O'Rourke. Sep 80, 44p ISBN-0-906120-34-9

This report attempts to apply the information collected from these various sources to the particular conditions of Irish local authority solid waste operations. Section 1 examines the sources, quantities and characteristics of local authority solid waste arisings and discusses some factors influencing disposal treatment; Sections 2 and 3 describe the main non-recovery and recovery options available as alternatives to untreated landfill disposal; Section 4 is concerned with the primary materials and the degree to which these are recovered in Ireland.

PB81-214538 PC **A02**/MF **A01**
Miljoestyrelsen, Copenhagen (Denmark).
Deposition of Flyash (Deponering af Flyveaske).
Apr 79, 15p ISBN-87-503-2914-6
Text in Danish, Abstract in English.

In the opinion of the Environmental Board, permanent deposition of flyash is not the right solution long-term since there is evidence that much of Denmark's flyash can be utilized in the production of cement and concrete as well as for road building. Nevertheless, there will be continued permanent deposition of some flyash as well as temporary storage. According to Report nr 12, December 1978 in the series 'Environmental Project,' the chemical composition of coal ash depends largely on geological and geographical factors associated with the coal field, burning conditions and the effectiveness of the smoke-purification equipment. Studies show that environmental effects can be lessened by careful planning, such as depositing flyash in controlled areas approved by local authorities or in special depots. Dumping at sea by creating an artificial island must be approved by the Ministry of Public Works in cooperation with various authorities, including the Environmental Board. The Ministry of Public Works must also approve the piping system whenever flyash is piped into the sea in accordance with a directive issued 18 May 1977. Waste-water drainage from such deposits at sea must be approved by local authorities in compliance with waste water regulations.

PB81-214629 PC **A03**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
The Discount Rate in Road Engineering Studies.
Technical rept.,
F. X. Jurgens. Nov 79, 28p RT/66/79

The intention of the report is to provide the road engineer with a guide which covers the more important concepts behind the selection and usage of an appropriate discount rate for economy studies. The effects of inflation in this context are also clarified. It is recommended that if a discount rate is required without resorting to detailed calculation, a rate of ten percent be chosen, but if the road engineer wishes to make a more sophisticated study, he may undertake a sensitivity analysis to test the effects of a number of different discount rates.

PB81-214652 PC **A07**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
An Evaluation of Existing Travel Demand Estimation Procedures for Long Term Urban Transportation Planning.
Technical rept.,
D. B. Rathbone. Oct 79, 141p RT/48/79

During the last few years a number of travel demand estimation techniques for long term strategic planning have been developed. The primary objective of this research project was to select, after quantitative analysis, the most appropriate technique for application in medium and large sized cities in South Africa. The functions, data needs, appropriate level of effort and the necessary accuracy for each different level of urban transportation planning intially were identified. This effort defined the objectives and scope of long term strategic planning. Various non-conventional planning techniques (e.g., techniques that do not follow the usual four-step procedure of trip generation, trip distribution, modal split and assignment) were then qualitatively evaluated in order to select the best technique for an quantitative evaluation against the simplified conventional planning technique.

PB81-214710 PC **A06**/MF **A01**
Waterloo Univ. (Ontario). Dept. of Earth Sciences.
Parametric Study of Potential Contaminant Transport at the Proposed Delmarva Power and Light Company Plant Site, Vienna, Maryland.
Final rept.,
Emil O. Frind, and Carl D. Palmer. Dec 80, 110p PPSP/JHU/PPSE-8-15

Sponsored in part by Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.

The potential leachate transport in the groundwater under the proposed site is studied. The study is done on an idealized geologic cross-section and it involves a parametric analysis of time-varying contaminant concentrations generated by a nonlinear finite element model. Variable parameters include the waste pile deposition mode, the leachate entry mode, the rate of natural recharge, the leachate density, the hydraulic conductivity of the aquifer, and the dispersivity of the aquifer materials. Parameters are selected on the basis of field and laboratory data, except for dispersivity, which is estimated on the basis of values published in the literature. The waste pile is assumed to be open to precipitation. Rainwater is assumed to become chemically saturated in passing through the waste pile. Results indicate that a waste pile situated above the water table produces less contamination than one that is in contact with the water table. No significant density effect is found within the range of parameter values investigated. Concentrations within the leachate plume are found to stabilize progressively, the stable subregion appearing first under the source and expanding gradually downstream, while the tip of the plume continues to advance indefinitely. Maximum concentrations, when the waste pile is not in contact with the water table, are found to depend primarily on the rate of natural recharge and the size of the waste pile.

PB81-214769 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Economic Impact Analysis of Alternative Pollution Control Technologies: Wet Process and Insulation Board Subcategories of the Timber Products Industries.
Final technical rept.
Jan 81, 92p EPA-440-2-80-089

The Economic Impact Analysis Assessment of the Hardboard/Insulation board industry is a support document for the effluent limitations (Best Available Technology, Pretreatment Standard for Existing Source, Pretreatment Standards for New Source, New Source Performance Standards) promulgated pursuant to Sections 301, 304 and 306 of the Clean Water Act, on January 7, 1981. The report includes an industry characterization (processes, market structure and financial information), industry costs from compliance from the effluent limitations and an economic impact analysis for existing and new sources resulting from the effluent limitation. Wet process hardboard is made from inter-felted wood fiber, using a wet forming and either a wet or dry pressing process. Hardboard products include interior paneling, exterior siding and industrial use products. There are 16 wet process plant operated by 11 producers. In 1976, the median, after-tax profit for a 200-million-square foot wet process hardboard plant was about 7%; the industry range was from 1% to 13%.

PB81-214918 PC **A15**/MF **A01**
Battelle Columbus Labs., OH.
Solid Waste: Methodology for Evaluation. Volume II: Analysis of Residual Wastes.
Final rept.,
Herbert C. Miller, Ruby H. James, and Walter R. Dickson. Dec 80, 349p
Contract EPA-68-02-2685
See also Volume 1, PB81-214900.

This report presents the results of a program of evaluation of analytical methods for 'Total Content' of residual wastes. Candidate methods were first studied and modified, and then evaluated by analyzing a variety of industrial residuals for a broad range of organic compounds and metals. The results, based on statistical analysis of over 10,000 data points, are quoted primarily in terms of observed accuracy and precision. The methods depend on extraction, gel permeation chromatography cleanup, preconcentration, and GC/MS analysis for identification and quantitation of semivolatile organics; purge-and-trap and GC/MS for purgeable organics; and acid digestion combined with AAS or ICP determinations for metals. An edited text of the evaluated methods is presented in the format specified by EMSL-Cincinnati for standard methods as an appendix to this report. Southern Research Institute and Battelle-Columbus Laboratories exchanged methodologies developed for Total Content and Potential Mobility and applied these procedures to the analyses of samples in an interlaboratory study. Results of SoRI's contribution to the interlaboratory study are presented in the appendices to this report.

PB81-215238 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Bridges, Culverts, and Tunnels,
William Zuk, Kenneth N. Derucher, Conrad P. Heins, Richard M. McClure, and Robert M. Barnoff. 1980, 54p TRB/TRR-785, ISBN-0-309-03174-5
Library of Congress catalog card number 81-9571. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

The 8 papers in this report deal with the following areas: forecast of bridge engineering: 1980-2000; bridge and pier protective systems and devices; conventional and through-voided box beams subjected to combined loading; strengthening of bridge beams and similar structures by means of epoxy-resin-bonded external reinforcement; latex-modified concrete bridge deck overlays: field performance analysis; reinforced-concrete arch culvert research by the California Department of Transportation; evaluating scour at culvert outlets; test simulations of a single-track subway environments.

PB81-215402 PC **A13**/MF **A01**
Chicago Aerial Survey, Des Plaines, IL.
Improving Surface Coal Refuse Disposal Site Inspections,
R. A. Meister, and R. L. Hoffman. Jun 80, 297p BUMINES-OFR-54-81
Contract J0188027
Color illustrations reproduced in black and white.

The study on improving surface coal refuse disposal site inspections included surface inspections of 15 refuse disposal sites. Monthly aerial photos were taken of the sites and computer methods were used to determine elevation changes. Photogrammetric techniques that were used are described in detail. A comparison of the results of each of these inspection techniques is included. A detailed evaluation of the photogrammetric techniques was made and conclusions were drawn concerning the advantages and disadvantages of using aerial photography and photogrammetry as part of the inspection procedure. Operators' opinions of the aerial photography methods are included.

PB81-215600 PC **A08**/MF **A01**
Montgomery (James M.), Inc., Pasadena, CA.
Industrial Wastewater Reuse: Cost Analysis and Pricing Strategies,
G. P. Treweek, N. Hixson, P. Teigen, and K. Fox. Apr 81, 170p W81-03601, OWRT/RU-80/7
Contract DI-14-34-0001-8817
See also Appendices, PB81-215618.

This report discusses the overall planning procedures for a wastewater reclamation and reuse project, with emphasis on those unique steps not generally associated with a facilities plan. Several computer programs, designed to speed the calculations involved in determining the necessary wastewater treatment steps, the size and cost of reclaimed wastewater delivery systems, and present worth calculations, are presented as a means to simplify the overall planning procedure. The second section of this report deals with the development of pricing strategies for a wastewater reclamation and reuse project, which often will cross traditional boundaries between fresh water distribution and wastewater collection and treatment. Also presented are case histories which illustrate the application of the previously developed computer programs and pricing strategies.

PB81-215618 PC **A14**/MF **A01**
Montgomery (James M.), Inc., Pasadena, CA.
Industrial Wastewater Reuse: Cost Analysis and Pricing Strategies. Appendices,
G. P. Treweek, N. Hixson, P. Teigen, and K. Fox. Apr 81, 324p W81-03602, OWRT/RU-80/7-APP
Contract DI-14-34-0001-8817
See also PB81-215600.

Two computer models, CHEMTRT and REUSE, were developed to assist the reuse planner in analyzing the water quality and quantity constraints in developing a wastewater reclamation and reuse project. Program descriptions and listings are presented in this appendix.

PB81-215659 PC **A05**/MF **A01**
Oklahoma Water Resources Research Inst., Stillwater.
The Impact of Behaviorial Factors on Residential Water Conservation.
Technical completion rept.,
John C. Mowen, and R. Dennis Middlemist. Dec 80, 86p W81-03607, OWRT-C-90220-C-(9450)(1)
Contract DI-14-34-0001-9450

This study was an initial effort in establishing an understanding of the behavoral factors influencing water consumption, was conducted in Stillwater, Oklahoma, where a temporary water shortage existed, and was conducted in three stages (experimental, pre- and post-experimental). It tested the efficacy of several practical approaches that would be implemented by water agencies to achieve temporary reductions in residential water consumption during short-term water shortages.

PB81-215667 PC **A08**/MF **A01**
Minnesota Univ., Minneapolis. Water Resources Research Center.
A Study to Identify the Potential of Naturally Occurring Zeolites for Removing Heavy Metals from Water.
Final rept.,
Michael J. Semmens. 31 Mar 81, 173p W81-03608, OWRT-B-150-MINN(1)
Grant DI-14-31-0001-5013
Prepared in cooperation with Minnesota Univ., Minneapolis. Department of Civil and Mineral Engineering.

Extensive studies were conducted to characterize the heavy metal cadmium (Cd) and copper (Cu) removal behavior of clinoptilolite (CL). Acidic or alkaline pretreatment of CL appeared to increase its capacity, as measured by sodium displacement by potassium. Calcium was found to be a major competing cation for Cd and Cu exchange by CL, and was difficult to displace from CL entirely. Isotherm studies at two CL particle sizes showed no significant difference in metal behavior, indicating exchange was not a surface-controlled reaction. Column tests (using CL and synthetic strong/weak acid resins) for Cd and Cu removal, designed from batch isotherm study results, were conducted to identify the effect of several parameters on metal removal performance. Column results using alkaline-pretreated (one molar NaOH for a day) CL showed excellent agreement with the batch isotherm data. Regeneration of Cd-laden CL showed a rapid initial Cd release was observed unless NaCl was added. Regeneration of the Cd-laden synthetic resins could be accomplished completely and the extended tailing of Cd release seen with Cd-laden CL did not occur.

PB81-215782 Not available NTIS
National Bureau of Standards, Washington, DC.
Audible Noise from High-Voltage Transmission Lines: Psychoacoustic Findings,
J. A. Molino, N. D. Lerner, and G. A. Zerdy. Sep 79, 13p
Proceedings of U.S. Department of Energy Environmental Control Symposium, held at Washington, DC. on November 28-30, 1978. Sponsored in part by Department of Energy, Washington, DC.
Pub. in Solar Energy, Geothermal Energy, and Waste Heat Transmission, v3 p243-255 1979.

The possible aversiveness of audible (corona) noise from extra-high voltage (EHV) transmission lines was investigated in a series of psychoacoustic experiments. Recordings of corona noise were made outdoors, generally at the edge of the property right-of-way. These recorded corona noise samples were then compared with other recorded environmental sounds, reference sounds, or spectrally-modified corona sounds, using a behavioral preference procedure. Results from three experiments, all employing the same general procedure, are presented here.

PB81-215915 PC **A11**/MF **A01**
Colorado Water Resources Research Inst., Fort Collins.
An Assessment of Water Use and Policies in Northern Colorado Cities,
Kelly N. DiNatale. Mar 81, 250p TR-28, W81-03603, OWRT-A-042-COLO(2)
Contracts DI-14-34-0001-9006, DI-14-34-0001-0106

Municipal water management policies and water use patterns were examined in 25 northern Colorado Front Range communities. Towns were classified on the basis of population; extent of metering, if any; and source of water supply, groundwater or surface water. Water use patterns were analyzed for a four-year period, 1975 to 1978. The effects of metering, water use restrictions and the 1976-1977 drought period on municipal water use were also determined. Metering of all residential customers was found to be the practice in 11 of the 25 communities.

PB81-215964 PC **A10**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Assessment of Space and Use Conflicts between the Fishing and Oil Industries. Volume I. Interactions between Fishing Gear and Oil Structures.
Final rept.
Jan 81, 212p BLM/YL/TR-81/01
Contract DI-AA551-CT9-26
See also Volume 2, PB81-215972.
Also available in set of 5 reports PC A99, PB81-215956.

This volume describes the types of fishing gear currently used and assesses the probable impact that oil and gas structures will have on their operation. Such structures include both surface and subsurface structures such as platforms, drilling rigs, subsea completions, pipelines, etc. The geographical scope includes the following regions: North Atlantic, Mid-Atlantic, South Atlantic, Gulf of Mexico, Southern California and Northern/Central California. The basic approach to the fishing gear descriptions was a literature review supplemented by numerous personal contacts.

PB81-215972 PC **A08**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Assessment of Space and Use Conflicts between the Fishing and Oil Industries. Volume II. Engineering Assessment.
Final rept.
Apr 81, 158p BLM/YL/TR-81/02
Contract DI-AA551-CT9-26
Prepared in cooperation with Dames and Moore, Los Angeles, CA. See also Volume 1, PB81-215964, and Volume 3, PB81-215980.
Also available in set of 5 reports PC A99, PB81-215956.

Volume II specifically addresses the engineering aspects of this study. The report describes th existing and proposed offshore oil and gas technologies, the criteria and constraints used for technology selection in OCS areas, and gives specific examples for the following regions: North Atlantic, Mid-Atlantic, South Atlantic, Eastern-Central Gulf of Mexico, Southern California, and Northern/Centeral California. Finally, mitigating measures and their related costs are discussed and specific examples are taken from experience in the North Sea.

PB81-215980 PC **A09**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Assessment of Space and Use Conflicts between the Fishing and Oil Industries. Volume III. Historical Interactions between the Fishing and Offshore Oil and Gas Industries.
Jan 81, 198p BLM/YL/TR-81/03
Contract DI-AA551-CT9-26
See also Volume 2, PB81-215972, and Volume 4, PB81-215998.
Also available in set of 5 reports PC A99, PB81-215956.

Volume III explores the historical interactions which have taken place between the fishing and oil and gas industries with respect to competition for labor, port space and other areas of impacts including fuel and repair facilities, equipment, supplies, and financing. This volume includes a detailed examination of effects which have taken place in the North Sea, Southern California, Western Gulf of Mexico and Davisville, Rhode Island.

PB81-215998 PC **A06**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Assessment of Space and Use Conflicts between the Fishing and Oil Industries. Volume IV. Catch Loss Model.
Final rept.
Jan 81, 104p BLM/YL/TR-81/04
Contract DI-AA551-CT9-26
See also Volume 3, PB81-215980, and Volume 5, PB81-216004.
Also available in set of 5 reports PC A99, PB81-215956.

The report presents results of a modeling effort to estimate the loss in catch to the commercial fishing industry due to OCS structures located on fishing grounds. The model assumes that fish move randomly in an area around an OCS structure. A Markov type statistical process is used to model the statistical probabilities of fish moving into and out of a designated buffer zone and the probability of being caught while outside the buffer zone.

PB81-216004 PC **A20**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Assessment of Space and Use Conflicts between the Fishing and Oil Industries. Volume V. Potential Port Impacts on Space, Labor, Marine Facilities, and Other Inputs.
Final rept.
Jan 81, 473p BLM/YL/TR-81/05
Contract DI-AA551-CT9-26
See also Volume 4, PB81-215998.
Also available in set of 5 reports PC A99, PB81-215956.

This volume presents the findings of site visits to 30 ports for the regions listed below and makes projections concerning the impacts of offshore oil and gas development on the fishing industry. The regions included in the analysis are the North Atlantic, Mid-Atlantic, South Atlantic, Gulf of Mexico, Southern California and Northern/Central California. Emphasis is placed on the needs of the fishing industry as compared to the needs of the oil and gas industry for vessels, labor, space, fuel, marine repair facilities, and other inputs.

PB81-216236 PC **A08**/MF **A01**
National Swedish Environment Protection Board, Stockholm.
Annual of the Environment Protection Administration 1980 (Naturvardsverkets Arsbok 1980),
Inger Olsson Vilborg, Robert Nilsson, Christine Jacobson, Ingrid Kokeritz, and Gudrun Wahlen.
Apr 80, 170p ISBN-91-38-05662-3
Text in Swedish, abstract in English. Also pub. as ISSN-0347-8173.

A general review, in articles by various authors, of the effect upon nature and the environment of various poisons and chemicals emitted. Article titles are: 'Environment Protection in Parliament and the Government', 'Poisons in the Past,' 'Society and Poisons,' 'The Law on Commodities Dangerous to Health and the Environment--How Does it Function.' 'Responsibility of Producers for Product Control,' 'Chemical Substances in the Environment,' 'Can Chemicals in the Environment be Reduced' 'Choose the Right Industrial Chemicals.' 'Waste Materials Dangerous to the Environment,' 'Use of Chemicals in Municipal Water Treatment Plants,' 'Do We Need Chemical Fertilizers.' 'Control Means. Registration and Classification,' 'Control Means in Forestry,' 'Control of Leaf-Shedding in Forestry,' 'Air Studied by Means of Laser,' 'Chlorinated Hydrocarbons in Animal Life in the Baltic Sea,' 'The OECD Program on Control of Chemicals,' 'Ecotoxicological Tests--An international Concern.' List of Publications by the Environment Protection Administration.

PB81-216426 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water Program Operations.
A Strategy for Small Alternative Wastewater Systems (SAWS).
Technical rept.
Dec 80, 46p

The objective of this Strategy paper is the development of a comprehensive planning and management approach to promote the use of and improve the performance of small alternative wastewater systems (SAWS). This Strategy covers a wide range of technological and managerial approaches to meet the wastewater collection, treatment, and disposal needs of small communities.

PB81-216525 PC **A06**/MF **A01**
Svenska Renhallningsverks-Foereningen, Stockholm (Sweden).
Municipal Waste-Treatment Methods (Metoder for Behandling av Kommunalt Avfall).
Feb 78, 124p
Text in Swedish.

In response to a directive from the Nordic Council Secretariat, the Association of Swedish Sanitation Works collected and processed data from various designated Nordic waste treatment plants during 1976 and 1977 for the purpose of informing those in charge of processing municipal waste products. The data includes methods of burning, grinding, composting, pyrrolization and utilization, together with ongoing research and developmental projects. A total of 30 Nordic waste treatment plants were studied. The main problem in connection with burning and grinding lies in the sorting of waste products, according to the report; presorting would reduce operational problems. Because of the disparity in the data, no final conclusions can be drawn with respect to environmental effects or environmental protective measures. The report also deals with ongoing recovery and utilization of by-products, such as heat, slag and compost. Plant and treatment costs are given, but various factors, local as well as national, make it difficult to compare costs.

PB81-216806 PC **A03**/MF **A01**
Geological Survey, Tacoma, WA. Water Resources Div.
Kriging Analysis of Mean Annual Precipitation, Powder River Basin, Montana and Wyoming.
Final rept.,
M. R. Karlinger, and J. A. Skrivan. May 81, 32p
USGS/WRD/WRI-81/050, USGS/WRI-80-50

Kriging is a statistical estimation technique for regionalized variables that exhibit an autocorrelation structure. Such structure can be described by a semi-variogram of the observed data. The punctual-kriging estimate at any point is a weighted average of the data, where the weights are determined by using the semi-variogram and an assumed drift, or lack of drift, in the data. Mean annual precipitation is an important variable when considering restoration of coal strip-mining lands in the Powder River basin, Montana and Wyoming. Two punctual-kriging analyses involving data at 60 stations were made--one assuming no drift in precipitation and one a partial quadratic drift simulating orographic effects. Contour maps of estimates of mean annual precipitation based on a period of 10 years of data were similar for both analyses, as were the corresponding kriging errors.

PB81-216848 PC **A05**/MF **A01**
IT Enviroscience, Knoxville, TN.
Fugitive Emission Sources and Batch Operations in Synthetic Organic Chemical Production.
Final rept.,
Dwight G. Erikson, Farrel D. Hobbs, Owen D. Ivins, Victor Kalcevic, and William L. Troxler. May 81, 94p EPA-600/2-81-083
Contract EPA-68-03-2568
Portions of this document are not fully legible.

This survey report was developed for the EPA for use in assessing the potential magnitude of fugitive volatile organic compound (VOC) emissions from agitator seals, cooling towers and batch operations in the production of 378 designated chemicals. The information presented in this report has been developed based on a review of the available open literature. Included in this review were published articles and reports, selected state air emission inventory questionnaires, and trip reports from visits to specific plant sites. Information on the type of operation, i.e., batch or continuous, and the quantity of specific fugitive source types associated with each process was evaluated and overall

industry estimates were made. Tabular groupings were developed and are presented for each of the designated chemicals in Part A of this report. A qualitative assessment of miscellaneous fugitive VOC emissions unique to batch operations is presented in Part B of this report.

PB81-217440 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Contractual Relationships: An Essential Ingredient of the Quality-Assurance System and Other Quality-Control Papers.
Transportation Research Record 792,
Edward A. Abdun-Nur, G. W. Steele, F. T. Higgins, Jr., R. W. Thompson, and James P. Dunne, Jr. 1981, 62p TRB/TRR-792, ISBN-0-309
Library of Congress catalog card No. 81-9536. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

The fifteen (15) papers in this report deal with the following areas: contractual relationships--an essential ingredient of the quality-assurance system; quality assurance--a system in practice; process control in practice; overview of quality-assurance program; optimizing state-contractor relations for improved quality assurance; summary of contractual relations: an essential ingredient of the quality-assurance system; contractual requirements and design philosophies employed to minimize adversary relationships: Eisenhower Memorial Tunnel, second bore; minimizing adversary contractual relationships for the Eisenhower Memorial Tunnel, second bore; minimizing potential for adversary contractual relationships during construction of Eisenhower Memorial Tunnel; management strategies for quality assurance for Pittsburgh's South Busway; Construction of Pittsburgh's South Busway: an engineer's viewpoint; contractor's viewpoint and case study of Pittsburgh's $27 million south busway program; analysis and application of correlated compound probabilities; method to exclude the effect of testing error when estimating the percentage defective of a continuous normal population; stratified random sampling from a discrete population.

PB81-217523 PC **A03**/MF **A01**
Miljoestyrelsen, Copenhagen (Denmark).
Waste Water Removal Outside Urban Districts (Spildevandsafledning Udenfor Bymaessig Bebyggelse).
Dec 78, 49p ISBN-87-503-2780-1
Text in Danish, abstract in English.

This report is a review of problems connected with waste water removal in small communities (less than 200 inhabitants) and in sparsely settled areas, including areas with summer cottages. About 1 million people live in such areas in Denmark, according to the 1970 census, and there are about 160,000 summer cottages in that country. Waste water removal is regulated by the Environmental Protection Law, which went into effect on October 1974, along with subsequent changes and proclamations from the Environmental Protection Ministry. According to the law, waste water questions are resolved by municipal and county authorities, the Environmental Protection Ministry, and the Environmental Appeal Board. In addition to Danish regulations, there are EC regulations to protect surface water and proposals for protecting groundwater. Work is underway to create waste water removal plans in all municipalities and counties. The report reviews various regulations pertaining to the discharge of waste water into rivers, lakes, ocean, and ground. Information concerning the granting, altering, and revocation of permits is given. Various types of toilet facilities are described and their relative merits discussed. Economic aspects of the various systems are also examined.

PB81-217853 PC **A03**/MF **A01**
ORINCON Corp., La Jolla, CA.
Control Strategies in Response to Freeway Incidents. Volume 1. Executive Summary.
Final rept. Oct 77-Apr 80,
H. M. Koble, and V. S. Samant. Nov 80, 42p FHWA/RD-80/004
Contract DOT-FH-11-9367
See also Volume 2, PB81-217861. Prepared in cooperation with KLD Associates, Inc., Huntington Station, NY.
Also available in set of 4 reports PC E19, PB81-217646.

New control strategies have been developed for responding to freeway incidents. Two types of incident situations were considered. In Situation 1, control is only needed at on-ramps in the immediate vicinity of the incident site. In Situation 2, control is also needed on freeway segments and connectors located upstream of the freeway segment containing the incident. The strategies were extensively tested under a wide variety of simulated incident conditions. Guidelines on strategy selection and usage in an operational environment have been prepared. Functional requirements have also been developed for an on-line incident control strategy evaluator which could pre-test the merits of several candidate strategies. This first volume presents an overview of the study highlighting the research methodology, major accomplishments, conclusions, and recommendations for future research.

PB81-217861 PC **A10**/MF **A01**
ORINCON Corp., La Jolla, CA.
Control Strategies in Response to Freeway Incidents. Volume 2. Evaluation of Strategy Performance Under Simulated Incident Conditions.
Final rept. Oct 77-Apr 80,
H. M. Koble, T. A. Adams, and V. S. Samant. Nov 80, 216p FHWA/RD-80/005
Contract DOT-FH-11-9367
See also Volume 1, PB81-217853, and Volume 3, PB81-217879. Prepared in cooperation with KLD Associates, Inc., Huntington Station, NY.
Also available in set of 4 reports PC E19, PB81-217846.

New control strategies have been developed for responding to freeway incidents. This second volume focuses on the strategy evaluation study for both Situation 1 and 2. It includes discussion of the strategies, the simulation models, the evaluation procedures, and the results.

PB81-217879 PC **A15**/MF **A01**
ORINCON Corp., La Jolla, CA.
Control Strategies in Response to Freeway Incidents. Volume 3. Software Documentation.
Final rept. Oct 77-Apr 80,
R. B. Goldblatt, H. M. Koble, and T. A. Adams. Nov 80, 330p FHWA/RD-80/006
Contract DOT-FH-11-9367
See also Volume 2, PB81-217861, and Volume 4, PB81-217887. Prepared in cooperation with KLD Associates, Inc., Huntington Station, NY.
Also available in set of 4 reports PC E19, PB81-217846.

New control strategies have been developed for responding to freeway incidents. This third volume documents the control strategy software as well as software designed to interface the strategies with the INTRAS freeway traffic simulation model.

PB81-217887 PC **A05**/MF **A01**
ORINCON Corp., La Jolla, CA.
Control Strategies in Response to Freeway Incidents. Volume 4. Operational Guidelines and Requirements for an On-Line Incident Control Strategy Evaluator.
Final rept. Oct 77-Apr 80,
H. M. Koble, and V. S. Samant. Nov 80, 100p FHWA/RD-80/007
Contract DOT-FH-11-9367
See also Volume 3, PB81-217879. Prepared in cooperation with KLD Associates, Inc., Huntington Station, NY.
Also available in set of 4 reports PC E19, PB81-217846.

New control strategies have been developed for responding to freeway incidents. This fourth volume contains the guidelines on strategy usage and the on-line incident control strategy evaluator functional requirements.

PB81-217903 PC **E10**/MF **E10**
Commission of the European Communities, Luxembourg.
Study into the Emission of Air Pollutants Coming from the Use of Coal within the United Kingdom.
c1980, 255p EUR-6853-EN, ISBN-92-825-2026-9
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Part 1 of the Report examines the present and future patterns of coal production and consumption in the UK and their effect on possible future levels of emission of three major pollutants, viz., sulphur dioxide, nitrogen oxides, and particulate matter; some consideration is given to trace element concentrations. A detailed technical analysis of the coal supplied and consumed according to consumer type and geographical regions is presented. Current coal preparation practice in the UK is described as well as its effect on sulphur content and the principal UK air pollution legislation. Part 2 includes an examination of the feasibility and economics of pollutant reduction during production and combustion processes with particular reference to such developments as fuel desulphurization, flue-gas washing and fluidized-bed combustion. (Copyright (c) ECSC-EEC-EAEC, Brussels and Luxembourg, 1980.)

PB81-217929 PC **E12**/MF **E12**
Commission of the European Communities, Luxembourg.
Selected Socio-Economic Aspects of Land Utilization. Seminar Held at Bayreuth (Germany, F.R.) on 22-26 October 1976.
M. J. Gardiner, and C. Husemeyer. c1980, 316p EUR-6876-EN, ISBN-92-825-2017-X
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The report is the proceedings of a seminar held in West Germany under the sponsorship of the Commission of the European Communities. Two topics emphasized were disadvantaged areas and rural environment related to man; future research needs in these fields were discussed.

PB81-218117 PC **A03**/MF **A01**
Performance Development Inst., Washington, DC.
Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series. Volume 7: Periodic Review and Technological Escalation of Performance Standards: New Source Performance Standards Review Process.
Interim rept.,
William H. Foskett, and Terry Olesen. Dec 80, 43p NBS-GCR-ETIP-81-94
Contract NBS-78-3603
See also Volume 1, PB80-187610.

This study is part of a research series by ETIP about the impacts of air pollution regulation on industrial innovation and creativity. It treats the results of periodic review of standards for new source performance. This review was mandated in order to incorporate technological advances that take place since the standards' original formulation. In fact, the study shows that revisions are seldom made raising the question as to whether technological advances are overlooked or are non-existent.

PB81-218273 PC **A06**/MF **A01**
Performance Development Inst., Washington, DC.
Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series. Volume 8: Controlled Trading and Site-Specific SIP Revisions: Competing for Attention in a Crowded Administrative Route.
Interim rept.,
Jay Evans. Dec 80, 108p NBS-GCR-ETIP-81-95
Contract NBS-78-3603

This report, one of a series of factors regarding the impacts on innovation of new regulatory incentives, deals with the administrative route being followed by 'controlled trading' incentives. The report presents case studies and analysis showing how the success of these new reforms is endangered by the slowness of the administrative route for approval in a State Implementation Plan (SIP).

PB81-218323 PC **A06**/MF **A01**
Hydroscience, Inc., Westwood, NJ.

Pilot-Scale Anaerobic Filter Treatment of Heat Treatment Liquor.
Final rept. Nov 76-Dec 79.
Jul 81, 116p EPA-600/2-81-114
Contract EPA-68-03-2484

This investigation was undertaken to demonstrate the application of the anaerobic filter in the treatment of liquor waste resulting from heat treatment of raw sludge in municipal sewage treatment plants. The liquor which contains high concentrations of soluble wastes is often returned to the heat end of a plant, where it can impose an additional load on the plant's operation and reduce its efficiency. Two pilot anaerobic filter columns were operated over a period of 18 months at the Muddy Creek Plant of the Metropolitan Sewer District of Greater Cincinnati. Operational data demonstrated high levels of BOD and COD removals from the raw heat treatment liquor. The generated gas contained 65 to 70 percent methane. Based on the pilot column studies, a suggested design and costs for an anaerobic filter unit were developed. These costs were compared to costs of other means of treatment such as the aerobic alternative. The anaerobic filter process had lower capital and operating costs than other modes of treatment. The gas produced was calculated to provide fuel to maintain the temperature of the filter at 35C, and provide additional capacity for other plant uses. These calculations show a net profit in operating costs. Further investigations to optimize design configurations are suggested.

PB81-218364 PC **A12**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Innovation in Public Transportation. A Directory of Research, Development and Demonstration Projects. Fiscal Year 1980.
Annual rept. 1 Oct 79-30 Sep 80.
Apr 81, 274p UMTA-MA-06-0086-81-1
Contract UMTA-MA-06-0086

The report contains descriptions of current research, development, and demonstration (RD&D) projects sponsored and funded by the Urban Mass Transportation Administration (UMTA) of the Department of Transportation. This Directory focuses on activity that took place in Fiscal Year 1980, which began on October 1, 1979 and ended September 30, 1980. Section 6 of the Act pertains to research, development, and demonstration projects in all phases of urban mass transportation, which includes technology development and deployment, service and methods demonstrations, and transportation planning and management. Under Section 8 of the Act, funds are authorized each year to conduct local transportation planning studies, otherwise known as Technical Studies. A portion of these Technical Studies funds are also used annually for Special Studies to help local planning agencies and UMTA improve the quality of information used for local transportation planning. Section 11 of the Act authorizes a program of University Research and Training Grants. These grants are designed to contribute to UMTA's research and to stimulate professional growth in fields relating to transportation.

PB81-218372 PC **A05**/MF **A01**
North Carolina State Univ. at Raleigh. Highway Research Program.
Evaluation of Base Courses for Flexible Pavements.
Final rept.,
W. G. Mullen, and B. D. Barnes. Feb 81, 100p
ERSD-110-67-5, FHWA/NC-81/002
Prepared in cooperation with North Carolina Dept. of Transportation, Raleigh. See also Aug 70, PB-197 162.

Nineteen pavement sections monitored over a period of approximately ten years have been evaluated to determine the influence of base course parameters on the performance of primary flexible pavement systems in Piedmont, North Carolina. The research relied essentially on the Present Serviceability Rating concept as a measure of performance. The findings of the research indicates roughness measures are insensitive to changes in subjective performance, present design procedures are adequate and probably conservative, at least, for the pavements studied. Bituminous concrete base courses are not necessarily structurally superior to coarse aggregate base courses, and Benkleman beam deflections are poor indicators of performance.

PB81-218513 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Transportation Finance, Equity, and Cost Allocation.
Transportation research record,
Douglass B. Lee, Robert P. Warren, Anthony D. Rogers, John Collura, and Russell Beliveau.
1981, 29p TRB/TRR-791, ISBN-0-309-03205-9
Library of Congress catalog card number 81-9548.
Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The four (4) papers in this report deal with the following areas: recent advances in highway cost allocation analysis; proposed fare policy for advance-reservation bus service; income equity of two transit funding sources; and economic analysis of transportation pricing, tax and investment policies.

PB81-218604 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Engineering Research Center.
Optimization of Lengths of Alternative Watercourse Improvement Programs.
Water management technical rept. no. 57,
John O. Reuss. Jan 80, 64p AID-PN-AAH-593
Contract AID/ta-C-1411
Prepared in cooperation with Arizona Univ., Tucson; California Univ. at Davis; Utah State Univ., Logan; New Mexico Univ., Las Cruces, and Oregon State Univ., Corvallis.

This report is an attempt to establish a sound theoretical basis and develop computational methods for choosing between alternative methods of construction or improvement of watercourse systems that operate on a rotational or turn basis. These methods were developed for use in Pakistan where losses from some 80,000 watercourses serving over 30 million acres of land have been identified as a major problem.

PB81-218836 PC **A02**/MF **A01**
Miljoestyrelsen, Copenhagen (Denmark).
Example of Approval for Operating a Business According to the Environmental Protection Law, Section 5 (Eksempel pa Virksomhedsgodkendelse efter Miljoebeskyttelsesloven Kap. 5),
Jens Kampmann. Dec 78, 17p ISBN-87-503-2770-4
Text in Danish, abstract in English.

According to the Environmental Protection Law certain businesses, listed in the appendix to the law, must receive approval from environmental authorities to operate or to increase their operations in such a manner that would cause a higher level of pollution emanating from the plant or site in question. Since many local environmental administrators have requested that guidelines be given for writing certificates of approval for such businesses, the Environmental Protection Office has composed a sample approval for operating a business in conformity with the Environmental Protection Law. It is stressed that this sample is not the only possible format, but that is satisfies the requirements of the Environmental Protection Office. The document is written to approve the operation of a fictitious machine works. The exact location of the plant and the estimated time of construction and beginning of operations are indicated. A detailed description of activities planned at the plant are given, along with their anticipated impact on the environment. Limitations on emissions, noise, and waste disposal are presented.

PB81-218968 PC **A12**/MF **A01**
Denver Research Inst., CO. Industrial Economics Div.
Socioeconomic Analysis of Hazardous Waste Management Alternatives: Metholology and Demonstration.
Final rept.,
Graham C. Taylor. Jul 81, 275p EPA/600/5-81/001
Grant EPA-R-804661

A methodology for analyzing economic and social effects of alternatives in hazardous waste management is presented and demonstrated. The approach includes the use of environmental threat scenarios and evaluation of effects on and responses by parties-at-interest. The methodology is demonstrated by a case study of alternative approaches to hazardous waste management for Oregon. The report organizes, summarizes, and provides extensive information on hazardous waste management techniques. Research on risk preferences and its relationship to decision-making is reviewed, and appendices on methods for valuing various effects (such as environmental impacts), public attitudes toward environmental issues, and intergenerational discounting are included. The report constitutes a useful manual for hazardous waste management personnel and policymakers involved in environmental quality management.

PB81-219073 PC **A12**/MF **A01**
Midwest Research Inst., Kansas City, MO.
The Role of Agricultural Practices in Fugitive Dust Emissions.
Final rept.,
Thomas A. Cuscino, John S. Kinsey, Richard Hackney, Russel Bohn, and R. Michael Roberts.
Jun 81, 264p ARB-R-81/138
Contract ARB-A8-125-31

For the San Joaquin Valley, the Sacramento Valley, and the Imperial Valley, Midwest Research Institute quantified the impact of agricultural operations on fugitive dust emissions. Thirteen tests were performed in the spring of 1980 to quantify emission factors from discing, land planning, and vehicles traveling on unpaved farm roads. Six tests were performed in the fall of 1980 to quantify emission from sugar beet harvesting. Since fugitive emissions from a given operation can vary depending on physical properties of the soil or equipment, and depending on climate, predictive emission factors were developed to relate total inhalable and fine particulate emission factors to important independent variables. Significant relationships were determined between the emission factor and the soil silt content. An inhalable particulate emission inventory performed for the three valleys showed that in 1978, agricultural operations produced 148,000 Mg/year of fugitive dust less than 15 micrometer in aerodynamic diameter. Field crops yielded the most significant emissions while soil preparation was the most significant category of operations. Two categories of control techniques were suggested: (a) those that included control equipment to be added to the farm implement and (b) those that included operational modifications. Control efficiencies and potential emission reductions were estimated for these control techniques.

PB81-219156 PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Water Planning Div.
Best Management Practices Guidance, Discharge of Dredged or Fill Materials,
Robert E. Thronson. Sep 79, 100p EPA/440/3-79-023, EPA/440/3-79-028

Before any decisions can be made regarding the discharge of dredged or fill materials into waters of the United States, all probable impacts and feasible alternative sites must be considered. This will include evaluation of such factors as the necessity for discharges; sensitivity of the area to environmental impacts, both long and short term; possible alternative sites or a scheduling of operations; and effectiveness of available site-specific Best Management Practices to prevent, or minimize the impacts. Discharges of dredged or fill materials must comply with guidelines prepared by the Administrator of EPA pursuant to Section 404 (b) (1) of Public Law 95-217. This 'Best Management Practices Guidance' document has been prepared to provide State and areawide water quality management agencies, other State and Federal agencies, and the concerned public with information on readily-available processes, procedures, methods, and techniques that can be used to minimize or prevent environmental impacts that could result from the discharge of dredged or fill materials. It has been written in a manner that the reader does not have to be an expert in the discipline to be able to understand what the problems are and some of the solutions that are presently available.

PB81-219354 PC **A03**/MF **A01**
Patterson Associates, Inc., Chicago, IL.
Guidance for BAT-Equivalent Control of Selected Toxic Poliutants.
Final rept.,
James W. Patterson. May 81, 40p EPA-905/2-81-003
Prepared in cooperation with Patterson Associates, Chicago, IL.

This manual is intended to provide guidance to federal and state NPDES permit and pretreatment staffs in determining appropriate limitations for the discharge of selected toxic pollutants in the wastewater from industrial facilities where applicable Effluent Guidelines regulations are not available. From his extensive knowledge and comprehensive review of the treatment technology available to industry, the author has determined, in his best professional judgement, the final effluent concentrations that can be achieved using his estimate of best available technology (BAT) for the following toxic pollutants: arsenic, barium, cadmium, hexavalent chromium, total chromium, copper, cyanide, fluoride, iron, mercury, nickel, silver, and zinc. It is concluded that, aside from a few extraordinary situations involving unusual chemical interferences, the treatability levels provided in the manual should be applicable, independent of industrial category.

PB81-219438 PC **A07**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Detection and Interpretation of Trends in Oxidant Air Quality.
Final rept.,
Lowell G. Wayne, Katherine W. Wilson, and Clarence L. Boyd. Oct 76, 129p EPA-450/3-76-034
Contract EPA-68-02-1890

Trends in ambient levels of oxidants over periods of five years or more are reviewed for seven locations in the United States. Statistically significant downward trends were identified in the San Francisco Bay Area and in Denver. Trends in emissions of organic and NOx precursors over comparable periods are also reviewed. Only in San Francisco were the data sufficient to note a statistically significant relationship between precursor emission trends and the trend in ambient oxidant. Downward oxidant trends are most pronounced in the western part of the Bay area. Indications are that a five year period may not be sufficient to identify statistically significant trends in many areas. Downward trends in the Bay Area are much more pronounced when 13 years of records are examined.

PB81-219537 PC **A05**/MF **A01**
Washington Univ., Seattle. Dept. of Civil Engineering.
Effects of Planform Geometry on Tidal Flushing and Mixing in Marinas.
Final rept. Oct 78-Sep 79,
R. E. Nece, E. P. Richey, J. Rhee, and H. N. Smith. Jun 81, 84p EPA/600/3-81/039
Grant EPA-R-806146

Physical hydraulic models of marinas possessing rectangular planforms were tested to determine effects of various geometrical parameters on tidal flushing and internal circulation in small harbors. Parameters investigated were: (1) Planform geometry aspect ratio; (2) ratio of entrance cross-sectional area to basin planform area; (3) effect of rounding of corners in the basin interior; (4) orientation and location of a single entrance; (5) effect of two entrances versus a single entrance. It is concluded that for rectangular planform basins, optimum exchange is achieved when the basin length to width (aspect) ratio lies between 0.5 and 2.0, the interior corners are rounded and the single entrance centrally located on the seaward side of the harbor. Rounding has little effect on average flushing but does increase the uniformity of local exchange throughout the basin. Results were obtained through a photographic technique incorporating the use of a photodensitometer.

PB81-219545 PC **A06**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.
Small Fishing Ports in Southern New England, Volume Ib.
Final rept.,
John J. Poggie, James M. Acheson, and Richard B. Pollnac. 1980, 119p NSF/RA-800550
Contract NSF-AER77-06018
See also 1980, Volume 1, PB81-149080.

Social and cultural aspects of fisheries management were examined to establish basic data on the fishing communities and fisheries of southern New England. Five small ports were selected for study--Newport, Chatham, and Westport, Massachusetts; Newport, Rhode Island; and Stonington, Connecticut. These ports differ in terms of local, social, and geographical conditions, fishing styles, and emphases. Results of the study show that these ports act as a backup for the industry as a whole by (1) providing sources of fish for local markets; (2) using low energy models which reduce energy costs; (3) allowing individual fishermen a greater opportunity to find a port to suit their life-style; and (4) complementing tourist activities by supplying fresh seafood products. However, a conflict was found to exist between the commercial fisheries and businesses operating largely on the summer tourist trade. More money has been added to the local economy from the latter, resulting in restricted development of commercial fishing.

PB81-219560 PC **A05**/MF **A01**
Versar, Inc., Springfield, VA.
EPA Coal Cleaning Program.
Progress rept. Oct 78-Sep 79,
J. Moore, D. Sargent, and B. Hylton. Apr 81, 95p EPA-600/7-81-070
Contract EPA-68-02-3136

The report describes work during Fiscal Year 1979 by 12 organizations, both public and private, under EPA's Coal Cleaning Program, a program that explores the possibilities for wider use of coal as an environmentally acceptable energy source. Many aspects of coal were studied, including the use of low sulfur coal, removal of coal sulfur by coal cleaning, and measurement of emissions from the cleaning processes. Seventeen projects were active in three major research categories: environmental assessment, technology assessment and development, and pollution control technology. Several projects were aimed at achieving a better knowledge of the characteristics of estimated coal resources. One approach was to develop and understanding of the effects of geologic formation processes on the properties of the resulting coal--especially sulfur and ash content. Another was to develop empirical data bases from multiple source sampling programs, past and present, to help identify constituents of coal deposits and relate them to environmental and economic concerns. Other studies evaluated certain coal cleaning techniques, equipment, and systems to assess possibilities for their improvement. Alternative strategies were explored for compliance with SO2 emission rules for coal combustion, as were assessment and control of pollution from coal cleaning.

PB81-219594 PC **A04**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Vapor-Phase Cracking and Wet Oxidation as Potential Pollutant Control Techniques for Coal Gasification.
Final rept. Nov 76-Apr 81,
W. J. McMichael, S. K. Gangwal, D. A. Green, and F. O. Mixon. Jun 81, 56p RTI/1934/00-01F, EPA-600-7-81-096

The report gives results of an investigation of two techniques (hydrocracking of heavy organics in the raw gas prior to quency, and wet oxidation of the gasifier condensate) for pollutant control in coal gasification processes. Bench-scale experiments were used to determine rates of hydrocracking and wet oxidation as a function of process conditions and catalyst used. A microreactor system, capable of holding 1.0 cc of material to be screened for catalytic activity, was used in the hydrocracking studies. Benzene and alkylated benzene compounds were used as model compounds in determining the potential of various materials for cracking rates. Thiophene was used as a model compound for catalyst poisoning studies. Cracking rates were determined for coal-derived materials produced from bituminous and subbituminous coals and materials containing iron and nickel compounds. Experiments were carried out at 300 to 800 C and approximately atmospheric pressure. The most promising material screened was a triply-promoted iron oxide ammonia synthesis catalyst. It had the greatest activity at temperatures of practical interest for a control device and showed more sulfur resistance than the other materials screened. However, the catalyst was poisoned by sulfur: attempts to regenerate it by air oxidation were unsuccessful. Wet oxidation appeared competitive.

PB81-219644 PC **A13**/MF **A01**
Environmental Protection Agency, Washington, DC. Monitoring and Data Support Div.
Sources of Toxic Pollutants Found in Influents to Sewage Treatment Plants. II. Muddy Creek Drainage Basin, Cincinnati, Ohio.
Rept. no. 6 (Final),
P. Levins, J. Adams, K. Thrun, S. Coons, and A. Wechsler. Jun 79, 300p EPA/440/4-81-004
See also Volume 3, PB81-219651.
Also available in set of 5 reports PC E99, PB81-219636.

This report represents the initiation of a program to determine the types of sources of priority pollutants and the magnitude of their contribution to publicly owned treatments works (POTW). The initial phase, described in this report, is designed to study the non-heavy industry contributors. Thus, residential, commercial and light industry-type sources have been identified as those of primary interest. The complete study is to be carried out in phases and this report describes the result of the first phase of the program which was designed to develop a general approach, obtain background information, test alternative procedures and develop the basis for detailed planning of the full study. A detailed quality control program was implemented for this study. A total of 69 composite samples were collected for the generation of 140 samples for analysis, the increment coming from the quality control program. Samples were analyzed for all 129 priority pollutants (excluding asbestos) plus manganese and the classical parameters of pH, TEMP, TSS, TOC, BOD, COD, ammonia, oil and grease. Approximately 20 organic species were detected in the POTW influent and sewer samples, mostly at concentrations near the detection limit. Only several organic species were found above 10 mg/l, namely chloroform and other halomethanes, phenol, toluene and naphthalene (each at one sewer site) and three phthalates.

PB81-219651 PC **A10**/MF **A01**
Environmental Protection Agency, Washington, DC. Monitoring and Data Support Div.
Sources of Toxic Pollutants Found in Influents to Sewage Treatment Plants. III. Coldwater Creek Drainage Basin, St. Louis, Missouri.
Rept. no. 10 (Final),
P. Levins, J. Adams, P. Brenner, S. Coons, and K. Thrun. Oct 79, 210p EPA/440/4-81-005
See also Volume 2, PB81-219644 and Volume 4, PB81-219669.
Also available in set of 5 reports PC E99, PB81-219636.

This report represents the second in a series of studies of sewage treatment basins undertaken in order to determine the relative importance of major sources of pollutants found at the influent of publicly-owned treatments works (POTWs). The general categories of residential, commercial and industrial have been identified as appropriate classifications for this study. This second study was carried out in the drainage basin of the Coldwater Creek treatment plant in the metropolitan St. Louis, Missouri area. In contrast to the predominantly residential character of the Muddy Creek basin in Cincinnati, the Coldwater Creek basin area had a reasonable amount of flow from commercial and industrial sources in addition to the residential flow. The relative flow from these source types in the basin was: Residential: 78%, Commercial: 10%, Industrial: 12%.

PB81-219669 PC **A08**/MF **A01**
Environmental Protection Agency, Washington, DC. Monitoring and Data Support Div.

Sources of Toxic Pollutants Found in Influents to Sewage Treatment Plants. IV. R. M. Clayton Drainage Basin, Atlanta, Georgia.
Rept No. 10 (Final),
P. Levins, J. Adams, P. Brenner, S. Coons, and K. Thrun. Oct 79, 173p EPA/440/4-81/006
See also Volume 3, PB81-219651 and Volume 5, PB81-219677.
Also available in set of 5 reports PC E99, PB81-219636.

This report represents the third in a series of studies of drainage basins undertaken to determine the relative importance of major sources of pollutants found at the influent of publicly-owned treatment works (POTWs). The general categories of residential, commercial, aand industrial have been identified as appropriate classifications for this study. This drainage basin provided the opportunity to sample a larger fraction of commercial activity, including an entire downtown area, and had the largest and most chemically intensive industrial areas studied to date.

PB81-219677 PC **A08**/MF **A01**
Environmental Protection Agency, Washington, DC. Monitoring and Data Support Div.
Sources of Toxic Pollutants Found in Influents to Sewage Treatment Plants. V. Hartford Water Pollution Control Plant, Hartford, Connecticut.
Rept. no. 13 (Final),
P. Levins, J. Adams, P. Brenner, S. Coons, and C. Freitas. Nov 79, 173p EPA/440/4-81/007
See also Volume 4, PB81-219669 and Volume 6, PB81-219685.
Also available in set of 5 reports PC E99, PB81-219636.

This fourth study was carried out in the drainage basin of the Hartford Water Pollution Control Plant (WPCP) in Hartford, Connecticut. For the most part, this drainage basin provided the opportunity to sample an area comprised largely of commercial and residential flow, with minimal industrial interference. The sampling sites did include a downtown site, similar to the downtown site in Atlanta, which contained a minor industrial park.

PB81-219685 PC **A06**/MF **A01**
Environmental Protection Agency, Washington, DC. Monitoring and Data Support Div.
Sources of Toxic Pollutants Found in Influents to Sewage Treatment Plants. VI. Integrated Interpresentation,
P. Levins, J. Adams, P. Brenner, S. Coons, and G. Harris. Dec 79, 125p EPA/440/4-81/008
See also Volume 5, PB81-219677. Also pub. as Little (Arthur D.), Cambridge, MA. rept. no. ADL-81099-63.
Also available in set of 5 reports PC E99, PB81-219636.

A study has been carried out to determine the relative significance of the major sources type-residential, commercial, industrial-contributions of priority pollutants to POTW influents. A service area in each of four cities--Cincinnati, St. Louis, Atlanta, and Hartford--has been studied in detail. In each city, specific sampling sites were selected to represent each of the major source categories. In total, 11 residential, 10 commercial and 5 industrial sites have been sampled, in addition to the tap water and POTW influents. This report presents a summary analysis of the data made possible by integrating the results obtained from each of the cities and treating the data by source category. The data have been analyzed to determine the frequency of occurrence of toxic pollutants (specifically the list of 129 priority pollutants), their concentration levels, the sources of these pollutants, and the impact of the source contributions on the POTW influent. Manganese and several classical parameters (7XX series) were also measured and included in the data base. The analysis has been carried out within the constraints imposed by the inherent characteristics of each of the major source categories - residential, commercial, industrial - concerning the range of discharge levels which was observed for each category.

PB81-219784 PC **A15**/MF **A01**
Environmental Protection Agency, Atlanta, GA. Region IV.
Farmland Industries, Inc., Phosphate Mine, Hardee County, Florida.
Draft environmental impact statement.
May 81, 349p EPA-904/9-81-072
Prepared in cooperation with Corps of Engineers, Jacksonville, FL. Jacksonville District. See also Volume 1, PB81-219792.
Also available in set of 3 reports PC A99, PB81-219776.

Farmland Industries, Inc. has proposed an open pit phosphate mine and beneficiation plant on a 7810-acre site in west central Hardee County, Florida. Mining and processing will involve 5280 acres, all of which will be reclaimed, and will produce 2 million tons of phosphate rock per year for 20 years. The EIS examines alternatives, impacts and mitigative measures related to air, geology, radiation, ground water, surface water, ecology and other natural and cultural systems.

PB81-219792 PC **A19**/MF **A01**
Environmental Protection Agency, Atlanta, GA. Region IV.
Farmland Industries, Inc., Phosphate Mine, Hardee County, Florida. Supplemental Information Document. Volume 1.
Draft environmental impact statement.
May 81, 448p EPA-904/9-81-072A
Prepared by Woodward-Clyde Consultants, Clifton, NJ. Environmental Systems Div. See also PB81-219784 and Volume 2, PB81-219800.
Also available in set of 3 reports PC A99, PB81-219776.

Farmland Industries, Inc. has proposed an open pit phosphate mine and beneficiation plant on a 7810-acre site in west central Hardee County, Florida. Mining and processing will involve 5280 acres, all of which will be reclaimed, and will produce 2 million tons of phosphate rock per year for 20 years. The EIS examines alternatives, impacts and mitigative measures related to air, geology, radiation, groundwater, surface water, ecology and other natural and cultural systems.

PB81-219800 PC **A14**/MF **A01**
Environmental Protection Agency, Atlanta, GA. Region IV.
Farmland Industries, Inc., Phosphate Mine, Hardee County, Florida. Supplemental Information Document. Volume 2.
Draft environmental impact statement.
May 81, 309p EPA-904/9-81-072B
Prepared by Woodward-Clyde Consultants, Clifton, NJ. Environmental Systems Div. See also Volume 1, PB81-219792.
Also available in set of 3 reports PC A99, PB81-219776.

Farmland Industries, Inc. has proposed an open pit phosphate mine and beneficiation plant on a 7810-acre site in west central Hardee County, Florida. Mining and processing will involve 5280 acres, all of which will be reclaimed, and will produce 2 million tons of phosphate rock per year for 20 years. The EIS examines alternatives, impacts and mitigative measures related to air, geology, radiation, groundwater, surface water, ecology and other natural and cultural systems.

PB81-219941 PC **A07**/MF **A01**
New York Sea Grant Inst., Albany.
Historic Bluff Recession Along the Lake Ontario Coast, New York,
Thomas Drexhage, and Parker E. Calkin. Jan 81, 133p NOAA-81042817

Coastal erosion along lakes and oceans significantly affects coastal activities, resources, and property values. Experience shows that attempts to control natural forces (such as erosion) based on partial knowledge are sometimes disastrous. Therefore, a workable model of the forces involved in natural erosion needs to be established before attempting large experimental projects in erosion control. One component of coastal process - bluff recession - is measured and analyzed. Rates of bluff line recession at 250 sites in six counties along the coast of Lake Ontario were measured.

PB81-220014 PC **A04**/MF **A01**
New York State Legislature, Albany.
Ridesharing: A Practical Transportation Alternative.
Rept. for 1 Sep 80-1 May 81,
Peter Derrick, Kathryn Stathakis, and Fran Komansky. May 81, 60p
Prepared in cooperation with the New York Legislative Commission on Critical Transportation Choices.

The report discusses ridesharing as an energy efficient mode of transportation. Broadly defined, ridesharing means two or more individuals traveling by a common mode of transportation. This report focuses on vanpooling, a form of ridesharing which enables 7 to 14 passengers to share rides to and from their work sites. The first section of the report highlights the various types of vanpools in operation across the country. Three types of vanpool programs exist: employer-based vanpools, third-party vanpools and employee owned and operated vanpools. That section is then followed by a summary of federal involvement in ridesharing. After that, the actions that various states have taken to encourage ridesharing are discussed. The last section of the report summarizes ridesharing efforts in New York, concluding with a number of recommendations aimed at rapidly increasing the number of vanpools in the state. •

PB81-220048 PC **A24**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Control Techniques for Sulfur Oxide Emissions from Stationary Sources. Second Edition.
Apr 81, 560p EPA-450/3-81-004
Contract EPA-68-02-3173
See also PB-190 252.

Control Techniques for Sulfur Oxide Emissions From Stationary Sources presents recent developments of control techniques which have become available since preparation of the first edition of Control Techniques for Sulfur Oxide Air Pollutants PB-190 252. This edition presents available data on characterization and sampling methods for sulfur oxides, descriptions of stationary sources of sulfur oxides and control techniques used to reduce sulfur oxide emissions. Control costs and energy and evironmental impact of controlling sulfur oxide emissions are also discussed.

PB81-220105 PC **A06**/MF **A01**
Water Resources Council, Washington, DC.
State Water Conservation Planning Guide.
Oct 80, 108p
Prepared in cooperation with Brown and Caldwell, Walnut Creek, CA.

The guide provides information on water conservation activities by all levels of government concerned with water resources management. It suggests a series in conduct of water conservation activities as an integral part of water resources planning. The guide contains a detailed bibliography of references that will be useful in planning for more efficient use of water. A number of optional planning procedures are described in the guide which can be selectively applied to match water resources conditions and the current stage of planning in any State.

PB81-220154 PC **A05**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Regulatory Decision Process and Its Consequences for Market Innovation.
Final rept.,
O. A. Davis, and R. B. Greene. Nov 79, 90p
NSF/PRA-7621012
Contract NSF-PRA76-21012

A chronological history is presented of studies concerned with the regulatory decision process and its consequences for market innovation. The first few chapters rely heavily on neo-classical economics, paradigms, and arguments; later chapters supplant the more untenable assumptions with more realistic and seemingly useful descriptions focusing on intra-organizational considerations rather than market phenomena. Individual chapters are devoted to (1) the topics of electric utility rate structures in achieving social innovations; (2) the use of advanced statistical techniques where previously simplistic and subjective methodologies were used; (3) the discrepency between commissioner and staff goals in developing a behavioral theory of resource allocation within the agency; and (4) development of a theoretical model of utility rate making which considers the behaviors of

regulated firms, the commission, and consumers; and a focus on the internal rate making processes of the Pennsylvania Public Utility Commission (PUC) after developing an organizational processes paradigm.

PB81-220501 PC **A05**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 1: Program Report.
Final rept.,
R. E. White. Dec 80, 92p EPA-450/3-80-023
Contract EPA-68-02-2577
See also Volume 2, PB81-220519.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume contains a brief history of the four year project and includes emission ranking information for 140 manufactured organic chemicals.

PB81-220519 PC **A11**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 2: Process Sources.
Final rept.,
J. W. Blackburn, and R. L. Standifer. Dec 80, 249p EPA-450/3-80-024
Contract EPA-68-02-2577
See also Volume 1, PB81-220501 and Volume 3, PB81-220527.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume covers the following process emission sources within organic chemical plants: air oxidation reactions, reactions involving carrier gases, vacuum producing systems, sulfuric acid recovery operations, and process upsets.

PB81-220527 PC **A15**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 3: Storage, Fugitive, and Secondary Sources.
Final rept.,
D. G. Erikson, J. J. Cudahy, V. Kalcevic, and R. L. Standifer. Dec 80, 344p EPA-450/3-80-025
Contract EPA-68-02-2577
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume covers emissions from storage tanks, fugitive sources (pump seals, valve seals, etc.), and secondary sources (emissions arising from treatment or disposal of process wastes).

PB81-220535 PC **A16**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 4: Combustion Control Devices.
Final rept.,
J. W. Blackburn, J. A. Key, H. S. Basdekis, and V. Kalcevic. Dec 80, 354p EPA-450/3-80-026
Contract EPA-68-02-2577
See also Volume 3, PB81-220527 and Volume 5, PB81-220543.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume covers the following devices that can be used to control VOC emissions: thermal incinerators, catalytic incinerators, and flares.

PB81-220543 PC **A15**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 5: Adsorption, Condensation, and Absorption Devices.
Final rept.,
H. S. Basdekis, D. G. Erikson, C. S. Parmele, and R. L. Standifer. Dec 80, 335p EPA-450/3-80-027
Contract EPA-68-02-2577
See also Volume 4, PB81-220535 and Volume 6, PB81-220550.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume covers the following devices that can be used to control VOC emissions: carbon adsorbers, condensers, and absorbers.

PB81-220550 PC **A18**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 6: Selected Processes.
Final rept.,
W. D. Burce, J. W. Blackburn, V. Kalcevic, S. W. Dylewski, and R. E. White. Dec 80, 404p EPA-450/3-80-028A
Contract EPA-68-02-2577
See also Volume 5, PB81-220543 and Volume 7, PB81-220568.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume presents in-depth studies of several major organic chemical products.

PB81-220568 PC **A17**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 7: Selected Processes.
Final rept.,
F. D. Hobbs, C. W. Stuewe, S. W. Dylewski, D. M. Pitts, and C. A. Peterson. Dec 80, 398p EPA-450/3-80/028B
EPA-68-02-2577
See also Volume 6, PB81-220550 and Volume 8, PB81-220576.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume presents in-depth studies of several major organic chemical products.

PB81-220576 PC **A16**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 8: Selected Processes.
Final rept.,
J. A. Key, C. W. Stuewe, R. L. Standifer, F. D. Hobbs, and D. M. Pitts. Dec 80, 363p EPA-450/3-80-028C
Contract EPA-68-02-2577
See also Volume 7, PB81-220568 and Volume 9, PB81-220584.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume presents in-depth studies of several major organic chemical products.

PB81-220584 PC **A23**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 9: Selected Processes.
Final rept.,
R. J. Lovell, J. A. Key, R. L. Standifer, V. Kalcevic, and J. F. Lawson. Dec 80, 545p EPA-450/3-80-028D
Contract EPA-68-02-2577
See also Volume 8, PB81-220576 and Volume 10, PB81-220592.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume presents in-depth studies of several major organic chemical products.

PB81-220592 PC **A25**/MF **A01**
IT Enviroscience, Knoxville, TN.
Organic Chemical Manufacturing. Volume 10: Selected Processes.
Final rept.,
C. A. Peterson, J. A. Key, F. D. Hobbs, J. W. Blackburn, and H. S. Basdekis. Dec 80, 578p EPA-450/3-80-028E
Contract EPA-68-02-2577
See also Volume 9, PB81-220584.
Also available in set of 10 reports PC E99, PB81-220493.

EPA is developing new source performance standards under Section III of the Clean Air Act and national emission standards for hazardous air pollutants under Section 112 for volatile organic compound emissions (VOC) from organic chemical manufacturing facilities. In support of this effort, data were gathered on chemical processing routes, VOC emissions, control techniques, control costs, and environmental impacts resulting from control. These data have been analyzed and assimilated into the ten volumes comprising this report. This volume presents in-depth studies of several major organic chemical products.

PB81-220824 PC **A11**/MF **A01**
MITRE Corp., McLean, VA.
Environmental Effects of Coal Technologies, Research Needs: A Report to the Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies.
Final rept.,
Richard D. Brown. Jun 81, 235p MTR-79W15903, DOE/HHS/EPA-07
Contract DE-AC01-79EV10018

This report is an assessment of environmental effects research needs associated with the coal-based technologies of conventional coal, chemical coal cleaning, fluidized bed combustion, magnetohydrodynamics, coal-oil mixtures, cocombustion with municipal solid waste, and in situ coal gasification. Background information providing technology descriptions, and characterization of air emissions, water effluents, and physical disturbances associated with these technologies is provided in another report.

PB81-220964 PC **A17**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Computer Assisted Procedure for the Design and Evaluation of Wastewater Treatment Systems (CAPDET) Program User's Guide.
Technical rept.
Jan 81, 391p
Sponsored in part by Environmental Protection Agency, Washington, DC. Office of Water Program Operations.

This manual provides guidance for the selection of wastewater treatment processes and systems and criteria for the design of wastewater treatment facilities using the Computer Assisted Procedure for the Design and Evaluation of Wastewater Treatment Systems (CAPDET). The information presented in this manual may be of interest to all persons concerned with the planning, design, and cost estimating associated with construction of new or upgraded wastewater treatment facilities.

PB81-220998 PC **A02**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
Recent Advances in Our Understanding of Salt Marsh Ecology,
Armando A. de la Cruz. 1980, 17p MASGP-79-012, NOAA-81042916
Grant NA79AA-D-00049
Pub. in Proceedings of the Gulf of Mexico Coastal Ecosystems Workshop, held in Albuquerque, NM, FWS/OBS-80/30 214p 1980. See also report dated May 80, PB80-197692. Prepared in cooperation with Mississippi State Univ., Mississippi State. Dept. of Biological Sciences.

Our understanding of the ecology of coastal marshes has revolved about the role of this ecosystem as a source and reservoir of energy and nutrients, and as a vital habitat for certain life stages of a number of marine organisms. While recent advances in salt marsh ecology have emphasized the metabolic processes and material fluxes that permeate the marsh-estuary, current research developments are geared towards a better understanding of the marsh as a carbon sink.

PB81-221517 PC **A02**/MF **A01**
Geological Survey, Harrisburg, PA. Water Resources Div.
The Effects of Highway Construction of Sediment Discharge into Blockhouse Creek and Steam Valley Run, Pennsylvania.
Executive summary (Final),
Robert A. Hainly. Nov 80, 7p USGS/WRI-80-68, FHWA/PA-80/7225
See also PB81-202202. Sponsored in part by Pennsylvania Dept. of Transportation, Harrisburg. Office of Research and Special Studies.

From October 1972 through September 1977, the effects of highway construction in the 38 square mile Blockhouse Creek basin were studied. Water discharge suspended-sediment discharge, and stream-temperature data were collected at four stations in the basin. The 5-year period included 1 year before construction, 2 years during construction, and 2 years after construction. The effects of stream relocation and sediment-control methods used in the highway construction were also investigated.

PB81-221558 PC **A02**/MF **A01**
Iowa Dept. of Environmental Quality, Des Moines.
Iowa Department of Environmental Quality.
Annual rept. 1979-80.
1981, 19p
See also PB80-184500.

The 1979-1980 Annual Report discusses the Iowa Department of Environmental Quality's major activities and programs for the 1979-80 fiscal year. Iowa's environmental achievements are highlighted. The major areas covered in the report are: DEQ Organization, Air and Land Quality, Chemicals and Water Quality, Regional Programs, Compliance and Planning, Administrative Services and the Financial Summary.

PB81-221616 PC **A07**/MF **A01**
Performance Development Inst., Washington, DC.
Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series. Volume 6: Innovation by Regulation: The Administration of Control Technology Requirements Under the Clean Air Act.
Interim rept.,
William Foskett, Adrienne Jamieson, and Jay Evans. Mar 81, 148p NBS-GCR-ETIP-81-93
Contract NBS-78-3603
See also Volume 7, PB81-218117.

This report, one of a series on factors affecting innovation through regulatory reform, presents case histories and analysis regarding the impact on innovation and technology of certain provisions of the Clean Air Act. Since new reforms are built on these requirements, their future is dependent on how they work. The report finds problems in the linkage between the Clean Air Act and industrial innovation.

PB81-221822 PC **A02**/MF **A01**
Williams and Works, Grand Rapids, MI.
Reuse of Municipal Wastewater by Volunteer Fresh-Water Wetlands (Vermontville, Michigan).
Summary rept. (Final),
F. B. Bevis. Feb 81, 19p NSF/CEE-81010
Grant NSF-ENV78-20273
See also PB-299 262 and PB81-221830.

The Vermontville, Michigan wastewater treatment system constructed in 1970-71 to treat domestic flows for a design service population of 975 is described. The system is based on stabilization pond-upland irrigation systems which were first designed in Michigan in response to rural community needs for affordable secondary-level treatment and phosphorous removal. Studies done at Vermontville include investigations on (1) water quality from the component collection and treatment facilities; (2) profiles of soils beneath the fields; (3) vegetation types, abundance, and communities; (4) vegetation biomass and phosphorous, and nitrogen uptake; (5) wet and wildlife habitat and comparison to ambient natural wetlands; (6) survivability of sensitive plant species; and (7) capital and O & M cost comparisons. Results of this work and of similar systems in other Michigan communities--Paw Paw, Kinross/Kincheloe, Lake Odessa, and Leoni Township--are presented. A major finding was that the plant-uptake is ineffective as a phosphorous-removal mechanism.

PB81-221830 PC **A03**/MF **A01**
Williams and Works, Grand Rapids, MI.
Reuse of Municipal Wastewater by Volunteer Fresh-Water Wetlands (Vermontville, Michigan). Appendix P: Plant Communities, Standing Crop, Nutrient Uptake and Wildlife Observations, 1978 and 1979,
F. B. Bevis. Feb 81, 48p NSF/CEE-81011
Grant NSF-ENV78-20273
See also PB-299 262 and PB81-221822.

Presented is one of several appendices to a study of a wastewater treatment systems in Vermontville, Michigan. The system is based on stabilization pond-upland irrigation systems designed in response to rural community needs for affordable secondary level treatment and phosphorus removal. Data are provided for the following regions and subjects: (1) Kinross Peatland, Chippewa County--major plant communities with associated substrates and landforms, and standing crops; (2) Paw Paw and Lake Odessa--wildlife observations; and (3) Vermontville--cattail-growth statistical summaries, composite standing crop summary, total phosphorous and nitrogen in standing crops, and wildlife observation.

PB81-221863 PC **A05**/MF **A01**
Arizona Agricultural Experiment Station, Tucson.
Liners of Natural Porous Materials to Minimize Pollutant Migration.
Final rept. Oct 75-Sep 77,
Wallace H. Fuller. Jul 81, 86p EPA-600/2-81-122
Grant EPA-R-803988

When landfills are not completely impermeable then underlying groundwater may be contaminated by leachate constituents if these are not adequately retained by soils. Research on industrial waste disposal has centered on use of manufactured products such as plastics and cementing roadbed materials such as asphalt and concrete to alleviate this problem by completely preventing liquid movement out of the landfill. Little attention has been given to use of natural low-cost materials as barriers for minimizing pollution migration out of landfills by retaining contaminants from liquids as they pass. This is a report of the relative effectiveness of natural low-cost liners of crushed limestone, clayey soil, hydrous oxides of iron, and crushed pecan hulls for minimizing the migration of Be, Cd, Cr, Fe, Ni, Zn, and total organic carbon constituents of municipal solid waste landfill leachates. Several leachate variables such as aqueous dilution, aeration, pH, and flux were also studied for their effect on movement of metals through 11 representative U.S. soils. The research was conducted on a laboratory scale using soil columns as a first step in screening for potential liners and manipulation practices. Limestone and hydrous iron oxide were found to be potentially useful as porous liners for retention of metallic leachate constituents. The amounts of these materials in natural soils were also found to be useful predictors of contaminant removal.

PB81-222127 PC **A19**/MF **A01**
SYSTAN, Inc., Los Altos, CA.
Paratransit Handbook: A Guide to Paratransit System Implementation Volume I-Parts 1-3.
Final rept. Sep 77-Jan 79,
J. W. Bellheimer, R. E. Lave, P. Jones, C. Fratessa, and D. Newman. Feb 79, 443p DOT-TSC-UMTA-79-6-VOL-1, UMTA-MA-06-0054-79-1
Contract DOT-TSC-1392
See also PB81-222135.

The Paratransit Handbook has been developed as a guide to aid public officials, planners, system operators, and interested community groups in planning, designing, implementing, operating, and evaluating integrated paratransit systems. The Handbook represents a compendium of techniques and experience drawn from existing Dial-A-Bus and shared-ride taxi paratransit systems. Five interrelated sections contained in two volumes comprise the Handbook.

PB81-222135 PC **A16**/MF **A01**
SYSTAN, Inc., Los Altos, CA.
Paratransit Handbook: A Guide to Paratransit System Implementation Volume II-Parts 4 and 5.
Final rept. Sep 77-Jan 79,
J. W. Billheimer, R. E. Lave, P. Jones, C. Fratessa, and D. Newman. Feb 79, 365p DOT-TSC-UMTA-79-6-VOL-2, UMTA-MA-06-0054-79-2
Contract DOT-TSC-1392
See also PB81-222127.

The Paratransit Handbook has been developed as a guide to aid public officials, planners, system operators, and interested community groups in planning, designing, implementing, operating, and evaluating integrated paratransit systems. Volume II, Part 4, Service Components, Regulations, Analytical Procedures, and Sources (SCRAPS) contains detailed information to complement the planning and design process. Volume II, Part 5, The Appendices, also includes references, a glossary, summaries of individual system characteristics, and other technical material.

PB81-222259 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.

Mixing Phenomena in Industrial Fume Afterburner Systems.
Topical rept. Aug 79-Jun 81,
A. A. Putnam, and H. A. Arbib. Jul 81, 107p EPA-600/7-81-110, IERL-RTP-1224
Contract EPA-68-02-2629
See also PB-298 465.

The report reviews the physical-mixing phenomena involved in the reactions that occur in afterburners or fume incinerators. It considers mixing in after-burners from three points of view. It first covers typical designs of afterburner components that are involved in the mixing phenomena: with the paucity of performance information available, there is no clear-cut indication of the superiority of any particular design. Secondly, it considers the possible application of mathematical modeling principles developed for studies of conventional furnaces to afterburner design: although the problem for the afterburner is basically simpler, practical application of mathematical modeling still seems some time off. Thirdly, it presents empirical relations available in the literature for describing the performance of jet flow systems similar to various afterburner components: these relations permit an estimate of time/temperature histories of various flow paths through different afterburner designs. Overall, the design of adequate afterburners from the mixing point of view seems well within the current state of the art.

PB81-222267 PC **A09**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
Control of Utility Boiler and Gas Turbine Pollutant Emissions by Combustion Modification--Phase II.
Final rept. Jun 76-Jun 79,
E. H. Manny, and A. R. Crawford. Mar 81, 178p EE.5E.81, EPA-600/7-81-039
Contract EPA-68-02-1415
See also PB-281 078.

The report gives results of Phase II of a field study to assess the applicability of combustion modification (CM) techniques to control NOx and other pollutant emissions from utility boilers and gas turbines without causing deleterious side effects. Comprehensive, statistically designed tests were used to evaluate the effect of CM. The most extensively studied CM for utility boilers was staged firing at low excess air, which can reduce NOx emissions by up to about 50%, based on results of short-term tests. Tests of B and W's low-NOx, dual-fired utility boilers, special attention was paid to the determination of potentially adverse side effects: increased combustible emissions, unwanted changes in particulate mass loading and size distribution, reduced boiler efficiency, increased furnace slagging, and tube wall corrosion. Short-term tests indicate that staged combustion may be applied to coal-fired utility boilers. The extent of furnace tube wall corrosion and slagging could not be determined conclusively, based on results of short-term (300-hour) corrosion probing runs under low NOx and baseline operating conditions. It was found, however, that corrosion probes exposed for longer periods (300-1000 hours) may more effectively correlate with actual furnace tube corrosion rates.

PB81-222457 PC **A12**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Environmental Impact Statement, Jonathan New Community, Chaska, Minnesota. Volume I: Summary and Findings.
Final rept.
Apr 78, 273p
See also Volume 2, PB81-222465.
Also available in set of 3 reports PC E99, PB81-222440.

On October 9, 1970, Jonathan Development Corporation (JDC) entered into a Project Agreement with the United States of America, to develop a New Community in Carver County, Minnesota. Under the terms of the Agreement, the United States committed to guarantee $21 million of the Developer's borrowings for land acquisition and development. Accordingly, pursuant to the Agreement, a total of $21 million of Federally guaranteed Title IV (of the Housing and Urban Development Act of 1968) debentures were issued in two series: $8 million in October, 1970, and $13 million in June, 1972. Under the terms of the Agreement, the Developer initiated development of a new community in accordance with an approved Development Plan. However, as the result of severe financial difficulties brought about by changing market conditions, development of Jonathan has stalled. A number of alternative Development Plans have been proposed for action by NCDC. This Final Environmental Impact Statement evaluates the potential impact of six alternative development plans, including the plan as originally approved in 1970, on the environment.

PB81-222465 PC **A99**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Environmental Impact Statement, Jonathan New Community, Chaska, Minnesota. Volume II: Impact Analysis.
Final rept.
Apr 78, 720p
See also Volume 1, PB81-222457 and PB81-222473.
Also available in set of 3 reports PC E99, PB81-222440.

The following pages discuss the existing development and system conditions found in the New Town of Jonathan. Preceding each component's discussion, the reader will find a Definition of Concern for that component. Each alternative will independently build upon this common base. In order to accurately inventory development, existing and proposed, the entire project site was divided into numbered parcels. This division respected existing and future rights of way, park and open space areas and other pertinent considerations. The Appendix contains detailed tables and graphics delineating these parcels, their land use, acreage, projected development and time frame information for each alternative and for each phase.

PB81-222473 PC **A12**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Environmental Impact Statement, Jonathan New Community, Chaska, Minnesota. Volume III: Appendix,
Sep 77, 252p
See also Volume 2, PB81-222465.
Also available in set of 3 reports PC E99, PB81-222440.

The tables and graphics included provide a parcel-by-parcel, phase-by-phase description of each of the six alternatives.

PB81-222515 PC **A11**/MF **A01**
Calspan Corp., Buffalo, NY.
Evaluation of Lixiviation of Mine Wastes.
Open file rept. (Final),
K. L. Bainbridge, M. A. Wilkinson, and B. M. Mahar. Dec 80, 243p BUMINES-OFR-73-81
Contract J0199057

This report describes the results of a study to determine which types of, and to what extent, mining wastes can contaminate ground water through leaching of acid-forming or potentially toxic constituents. The primary focus of this study was on coal mining wastes, especially overburden spoils and preparation plant refuse. In addition, the potential for contamination by leachates from clean coal stockpiles was also examined. The study approach included investigation of the amounts and geographic locations of mining wastes in the United States; the chemical character or mining wastes, especially with regard to potentially acid-forming or toxic constituents; and the extent to which acid and/or toxic components are leached from mining wastes by rainwater. To evaluate the leachability of coal wastes, a laboratory waste leaching method was developed to specifically simulate the leaching process over a long term. Waste samples were also leached by the EPA extraction procedure and ASTM waste leaching method. Results of the three leachtest methods were compared to evaluate their relative capabilities to predict the leachability of mining wastes.

PB81-222796 PC **A16**/MF **A01**
Arizona Univ., Tucson.
Sulfur Pollution Control. Phase I. The Disposal Program (Sections 1 through 4).
Open file rept. (Final),
Michael Rieber, Roger Fuller, and Benjamin Okech. Jan 81, 363p BUMINES-OFR-94(1)-81
Contract J0188144
See also Volume 2, PB81-222804.
Also available in set of 4 reports PC E99, PB81-222788.

This study develops the data base and an economic analysis of the primary sectors prerequisite to the regional projection of the supply side of the U.S. sulfur industry. The probable future course of sulfur pollution and process control in the United States and elsewhere as it impacts, by the production of sulfur values, the domestic Frasch industry, is estimated. A regional determination of the present and future U.S. sulfur supply market is presented.

PB81-222804 PC **A09**/MF **A01**
Arizona Univ., Tucson.
Sulfur Pollution Control. Phase I. The Disposal Program (Sections 5 through 7).
Open file rept. (Final),
Michael Rieber, Roger Fuller, and Osmario Dellaretti. Jan 81, 190p BUMINES-OFR-94(2)-81
Contract J0188144
See also Volume 1, PB81-222796 and PB81-222812.
Also available in set of 4 reports PC E99, PB81-222788.

Sulfur recovery from domestic sour natural gas and petroleum refining is estimated on a current basis and projected to the mid-1990's on a regional basis. The former depends importantly on gas production projections for the Overthrust Belt and the associated H2S. The latter depends largely on projected increases in the sulfur content and weight of imported crude oils, total crude oil imports, and anticipated refinery response.

PB81-222838 PC **A03**/MF **A01**
National Inst. for Water Research, Pretoria (South Africa).
How To Conduct an Industrial Waste Survey,
G. Wentzel, and J. W. Funke. 1979, 50p

Methods to assess the water and effluent situation within a factory are described in the report. The measurement of flow in open channels and in pipes is explained. Tables are given for the evaluation of flow over V-notches, rectangular weirs and from open-ended pipes with free fall. Different sampling methods and the interpretation of analytical data are reviewed.

PB81-222911 PC **A07**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
A Procedure to Predict Sediment Flow From Highway Construction Sites, Volume I.
Final rept.,
A. C. Miller, E. L. White, and W. W. Veon. Jan 81, 135p FHWA/PA-81/001
See also Volume 2, PB81-222929. Sponsored in part by Pennsylvania Dept. of Transportation, Harrisburg.

The disturbance of land by construction is almost invariably accompanied by sudden, sometimes drastic increases in potenial for soil erosion. The amount of sediment eroded and delivered to a stream should be minimized within practical economic limits. The degree of control will vary depending upon the location of the construction site and the consequences of increased sediment to the local environment. Effective erosion control begins in the planning and location of the highway route. Control of water and knowledge of the soils to be encountered are basic in determining measures for preventing erosion and the movement of sediment. If a highway location is selected with consideration of problems associated with these basic elements, erosion problems during construction will be greatly reduced. This report presents a prediction method to determine soil erosion from highway construction sites. The method utilizes a regression type equation developed from actual data collected from three central Pennsylvania highway location sites. The developed equation is

similar to the Universal Soil Loss Equation and is used to predict erosion on a per storm basis.

PB81-222929 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
A Procedure to Predict Sediment Flow From Highway Construction Sites Volume II.
Final rept.,
A. C. Miller, E. L. White, and W. Veon. Jan 81, 49p FHWA/PA-81/002
See also Volume 1, PB81-222911. Sponsored in part by Pennsylvania Dept. of Transportation, Harrisburg.

The Hydrology Laboratory of The Pennsylvania State University in a cooperative effort with the U.S. Geological Survey, Federal Highway Administration, and the Pennsylvania Department of Transportation was given the task of digitizing stream flow data, sediment graphs, turbidity hydrographs, and rainfall mass curves as measured downstream from highway construction sites. The purpose was to create a data bank that would be used in developing a sediment-predictive method for highway construction sites in Pennsylvania and be a source of information for other researchers. Besides the hydrologic data many construction parameters were also included (e.g. phase of construction, season of the year, type of soil, area cleared and grubbed). Sediment in streams resulting from highway construction was monitored for 11 sites within three different drainage basins in central Pennsylvania. Rainfall, stream flow (stage versus time), sediment concentration, and turbidity hydrographs have been evaluated for a number of storm events. Stream and sediment gauging to record flows and collect samples was done at prescribed intervals; intervals were smaller when there were rapid changes. Therefore, the runoff, sediment, and turbidity hydrographs were accurate to + or - 15 minutes. Stream flow data were available before, during, and following construction. In addition, one gauged watershed within each of the three drainage basins had no construction within the basin and was used as a control.

PB81-223265 PC **A08**/MF **A01**
Environmental Protection Agency, Washington, DC.
Ad Hoc International Meeting of Regulatory Officials on Alignment of Noise Test Procedures Held at Washington, DC., on December 9-12, 1980.
30 Apr 81, 167p

The information is presented in six product categories: Construction Equipment, Domestic Appliances, Miscellaneous, Railroads, Motor Vehicles, and Aircraft. For each category, two charts are presented. The first identified the specific products within the category, and the status (existing, under development, or anticipated) of regulation development, by country. The second chart presented detailed information on the regulations on a product by product basis.

PB81-223448 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Performance Aspects of Water Conservation Techniques for Appliances,
Charles C. Gordon, and Robert L. Palla, Jr. May 81, 41p NBSIR-81-2291
Sponsored in part by the Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

The performance of household clothes washers and dishwashers is evaluated assuming various water conservation methods. For clothes washers the effect of fill level setting on soil removal is presented. A guideline for setting fill level is suggested. For dishwashers the soil removal capabilities are evaluated at reduced fill volumes. An analysis of the percentage of soil removed for each wash/rinse subcycle shows the relative quantities of soil in the discharge for each subcycle.

PB81-223471 PC **A08**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Resource Recovery from Plastic and Glass Wastes.
Final rept.,
Jon Huls, and Tom Archer. Jul 81, 161p EPA-600/2-81-123
Contract EPA-68-03-2708

This research program was initiated with the overall objective of assessing and evaluating State-of-the-Art for recovery of glass and plastic from solid waste. Literature was gathered from numerous sources, contacts were made with industrial and recycling organizations, and questionnaires were distributed among applicable firms involved in glass and plastic recovery. Data derived from literature was collected, reduced and evaluated for technical, economic, and environmental content. Both glass and plastic industries were characterized by processes, material flows, economic dynamics, and waste generated. Methods for recovery, (e.g., collecting, aggregating, processing and transportating), and recycling were identified. Economic and environmental parameters are provided. Currently, labor-intensive source separation of glass and plastic predominate, although mechanical recovery will achieve greater importance in the years ahead. Finally, research activities and State-of-the-Art activities in foreign countries are identified. Where feasible, their relative importance is assessed.

PB81-223794 PC **A08**/MF **A01**
Decision Group, Inc., McLean, VA.
Freight Terminals Operating Environment.
Final rept. Mar-Jul 80,
R. E. Morris, and K. S. Merrill. Jun 81, 154p
DOT-TSC-RSPA-81-1
Contract DTRS-57-80-C-0031

The research analysis has been directed toward (1) developing a realistic, quantitative description of the structure of the economic zones that are centered upon medium-size urban areas, (2) determining the nature of traffic in manufactured goods which are most susceptible to intermodal transportation, and (3) identifying trends in the surface freight transportation environment to 1990 and beyond. The range and dispersion of the statistical data which describe each of the 13 urban areas that have been examined (three are adjacent city-pairs with a coalesced economic vitality) disclose the lack of a pattern of surface freight transportation services among medium-size communities. All of the traffic in fabricated commodities can be efficiently moved in intermodal service. Both the motor carriers and the railroads evidence either an open mind or a firm commitment to mutually beneficial intermodal ventures. Intermodal freight service will become the shippers' preferred option when (1) intermodal trains are given precedence and scheduled service becomes dependable, (2) rail and motor carriers establish transregional intermodal corridors as cooperative mutually profitable ventures, (3) organized labor evaluates the potential benefits of intermodal operations to its members, and (4) the hub concept of strategically located profitable intermodal facilities has been implemented throughout the rail industry.

PB81-224420 PC **A04**/MF **A01**
Charlotte Harbor Water Association, Inc., Harbour Heights, FL.
Inorganic Contaminant Removal from Drinking Water by Reverse Osmosis,
Martin R. Huxstep. Jul 81, 73p EPA-600/2-81-115
EPA-R-805207

The experimental data show the high-pressure system to be much more effective than the low-pressure system for the removal of all contaminants and natural constituents. The high-pressure system had rejections ranging from 78 to 99 percent, and the low-pressure system from 20 to 85 percent. Rejections varied with the specific contaminants, but the order from best to least was the same for both systems: arsenic V, fluoride, arsenic III, and nitrate. Because of the low rejections, the low-pressure system was able to achieve the EPA maximum contaminant levels when the feed water concentrations were only slightly above them.

PB81-225542 PC **A11**/MF **A01**
Engineering-Science, Inc., Arcadia, CA.
Summary of Technical Information for Selected Volatile Organic Compound Source Categories.
Final rept.,
May 81, 235p EPA/400/3-81/007
Contract EPA-68-01-4146

This document is a compilation of existing information of varying detail based on a review of the technical literature, published and unpublished EPA, State and local agency reports, and State or local air pollution control regulations concerning eighteen stationary sources of volatile organic compound emissions.

PB81-225559 PC **A10**/MF **A01**
TRW, Inc., Redondo Beach, CA.
Emissions Assessment of Conventional Stationary Combustion Systems: Volume V: Industrial Combustion Sources.
Final rept. Sep 76-Apr 81,
N. F. Surprenant, W. Battye, D. Roeck, and S. M. Sandberg. 1981, 203p EPA-600/7-81-003c
Contract EPA-68-02-2197
See also Volume 3, PB81-145195.

The report characterizes air emissions from industrial external combustion sources and is the last of a series of five reports characterizing emissions from conventional combustion sources. The emissions characterization of industrial combustion sources was based on a critical examination of existing data, followed by a modified Level 1 sampling and analysis approach to resolve data gaps. Tests were conducted at 32 external combustion sites. Emissions assessment results indicate that air emissions from these sources represent a potential environmental hazard. Criteria pollutant emissions, except for CO, from most of the source categories tested are environmentally significant. Particulate sulfate emissions from coal- and wood-fired sources and SO3 emissions from two coal-fired sources are also significant. In addition, emissions of several trace elements are of concern: As, Be, Cl, Co, Cr, Fe, K, Li, Na, Ni, P, and Pb from coal-fired external combustion sources; Ni, Cr, P, and V from distillate oil sources; and Cl, Cr, Na, Ni, Si, and V from residual oil sources. Several potentially hazardous POM compounds were tentatively identified in the emissions from solid-fuel-fired sources; however, further study is needed to positively identify the compounds.

PB81-227969 PC **A09**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Research Needs Relating to Emissions from Industrial Burners.
Final rept. 24 Nov 80-20 Mar 81,
C. Castaldini, A. K. Chatterjee, R. M. Evans, and M. A. Herther. May 81, 183p FR-81-80/EE, GRI-80/0022
Contract GRI-5080-351-0358

The R&D recommendations of this study result from a review of relevant, existing and anticipated federal and state environmental regulations and policies and from an assessment of the impact they may have on industrial gas-fired burners. Environmental considerations for natural gas combustion are almost entirely restricted to oxides of nitrogen. Federal regulations for NOx emissions from industrial gas-fired boilers require only minimal NOx reduction on some new boilers. More limiting regulations could arise from state PSD and nonattainment permit requirements, which could be significantly changed when the Clean Air Act is reviewed in 1981. California is the only state to enact stringent requirements thus far. Existing and planned California NOx regulations on utility and industrial boilers, refinery process heaters, cement kilns, and glass melting furnaces may require the most advanced control techniques. Development and field demonstrations of both conventional and catalytic low-NOx burners for these applications are of the highest priority for addressing NOx emission regulations in California and best prepare the industrial gas user for future regulations in other states or at the national level. R&D activities related to selective catalytic reduction, acid rain, and NO2 health effects are also recommended.

PB81-871477 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Waste Treatment and Disposal in the Fishing and Shellfish Industries. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 68p

Problems associated with waste treatment in the fishing and shellfish industries are discussed in terms of marine pollution. The use of coagulants, aeration, and electrolysis are included. (Contains 67 citations fully indexed and including a title list.)

PNL-SA-8959 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Some Statistical Techniques for Evaluating an Air-Quality Model.
C. M. Berkowitz, R. C. Williams, and D. J. McNaughton. 1981, 2p CONF-810436-4
Contract AC06-76RL01830
Environmetrics '81 conference, Washington, DC, USA, 6 Apr 1981.

A verification program for air quality models consisting of classical techniques is outlined. The procedures were developed during an analysis of the Pacific Northwest Laboratory's (PNL) Regional Air Pollutant Transport (RAPT) model. The RAPT model simulates the transport, vertical diffusion, transformation and removal of SO sub 2 and SO sub 4 . RAPT model predictions were examined in the hope that statistical analysis would lead to insight regarding the model's physical simulations. (ERA citation 06:024136)

SAND-78-0403(V.1) PC **A14**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Project Da Vinci: A Study of Long-Range Air Pollution Using a Balloon-Borne Lagrangian Measurement Platform. Volume I. Overview and Data Analysis. Final Report.
B. D. Zak. May 81, 314p
Contract AC04-76DP00789

Over the past decade, it has become clear that long-range air pollution is important over time and distance scales of days and hundreds of kilometers. With increasing reliance on coal, the problem is expected to become more severe. Project Da Vinci made use of a manned, instrumented balloon system to study long-range transport and transformation of air pollutants on these time and distance scales in a frame of reference moving with the polluted air. Results are reported here for the feasibility experiment conducted in 1974, and for the long-range air pollution studies launched from St. Louis during the summer of 1976. Among the most important results are measurements of the conversion rates of sulfur dioxide to sulfate in dilute power plant plumes mixed with the urban plume far downwind of the sources, and observations of the impact of nocturnal winds aloft on long-range transport. The project was a collaborative effort involving researchers from twenty-six organizations. An overview and data analysis are presented in this, the first of three volumes. (ERA citation 06:024137)

UCRL-85814 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Ozone Depletion Calculations.
F. M. Luther, J. S. Chang, D. J. Wuebbles, and J. E. Penner. Apr 81, 29p CONF-8007102-1
Contract W-7405-ENG-48
NATO advanced research institute on the effects of solar ultraviolet radiation on marine ecosystems, Copenhagen, Denmark, 28 Jul 1980.

In order to assess the potential impact of proposed perturbations on stratospheric ozone, mathematical models were developed to handle the complex coupling between chemical, radiative, and dynamical processes. Basic concepts in stratospheric modeling are reviewed. Of the proposed atmospheric perturbations shown to have a potentially significant effect on stratospheric ozone, chlorofluorocarbons (CFC) present the most significant threat (the estimated change in total ozone being about - 9% at steady state for continued CFC release at the current rate). Two-dimensional model calculations indicate that the largest decreases in ozone would likely occur at high latitudes in winter or spring. Oxides of nitrogen (NO, NO sub 2 , and N sub 2 O) can have a significant impact on ozone. Estimated 1990 aircraft fleet emissions are computed to lead to an increase of total ozone of 1.3%. The models are sensitive to increases in N sub 2 O, but this species is not projected to increase significantly over the next few decades. A doubling of CO sub 2 might lead to an increase in total ozone of about 6%, which would tend to offset the effect of a CFC perturbation. The decrease in ozone estimated to occur over the next several decades would be strongly dominated by the CFC perturbation because of the difference in the projected rates of increase of CFC's and CO sub 2 in the stratosphere. Although stratospheric models have been successful in diagnostic applications, significant uncertainties remain concerning their accuracy for prognostic applications. Uncertainties in chemical rate coefficients contribute most significantly to the uncertainty in model results. In spite of these uncertainties, there is good agreement between independent model predictions. (ERA citation 06:024140)

13C. Construction Equipment Materials, and Supplies

AD-A101 058/6 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Study of a Proprietary Pozzolanic Product.
Final rept.,
Alan D. Buck. May 81, 11p Rept nos. WES/MP/SL-81-8, ONWI-249
Contract DE-AI97-81ET46633

Petrographic examination and limited chemical analysis were used to identify constituents in a proprietary 'anti-corrosion' admixture (AD-644) for concrete. Petrographic examination included X-ray diffraction, light microscopy, and scanning electron microscopy. The CaO content of the sample was determined by chemical analysis as a basis for estimating cement content of the sample. The results indicated that the admixture was largely silica fume containing about 12 percent portland cement and a small amount of organic material which was believed to be a water-reducing admixture. Properties of a known silica fume (AD-536(2)) were used as a basis for concluding that silica fume was the principal constituent of this admixture (AD-644).

BNL-29502 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
New, Novel Well-Cementing Polymer-Concrete Composite.
A. N. Zeldin, L. E. Kukacka, and N. Carciello.
Sep 80, 32p
Contract AC02-76CH00016

The feasibility of using the products of free-radical copolymerization of cyclic and linear organosiloxanes in the formation of polymer concrete (PC) composites for use in the completion of geothermal wells has been demonstrated. The PC contained a mixture of tetramethylvinylcyclotetrasiloxane and polydimethylsiloxane used in conjunction with aggregate materials such as silica flour and portland cement. The use of these compounds resulted in composites with high strength and with thermal and hydrolytic stability. (ERA citation 06:023397)

PB81-870768 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dredging Equipment and Technology. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 134p

This bibliography cites reports on dredging technology and equipment. The subjects covered include special pumps and heads for various types of dredging operations. Associated technology includes positioning and maneuvering systems, submersible and hover dredges, and control systems. Maintenance operations are not included in this bibliography, but some mining operations, as they pertain to design, are included. (Contains 164 citations fully indexed and including a title list.)

PB81-870941 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dredging Equipment and Technology. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 125p

This bibliography cites reports about dredging technology and equipment. The subjects covered include special pumps and heads for various types of dredging operations. Associated technology includes unloading equipment for hopper dredges, split-hull dredges, and control systems. Maintenance operations are not included in this bibliography. (Contains 131 citations fully indexed and including a title list.)

13D. Containers and Packaging

PB81-220741 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Checking the Net Contants of Packaged Goods,
C. S. Brickenkamp, S. Hasko, and M. G. Natrella.
Jun 81, 166p NBS-HB-133

Compliance testing of packaged goods is the determination of conformance of the results (that is, the packages produced) of a packaging, distribution, and/or retailing process with specified legal requirements. This handbook provides procedures to test (by using statistical sampling techniques) individual lots of packages for conformance with legal requirements. Anything that is put into a container, wrapped or banded, and labeled as to quantity may be inspected.

PB81-871915 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Child Resistant Closures. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 193p

This bibliography contains citations concerning the type of child resistant closures in use today. The decrease in child hospitalization since their introduction and the difficulties encountered by the elderly when using this type of cap, is also noted. (Contains 145 citations fully indexed and including a title list.)

PB81-871923 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Bag-in-Box Packaging. January, 1972-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 83p

This bibliography contains citations concerning the development, design, applications, and advantages of bag-in-box packaging. The types of plastic film used are discussed in relation to the particular items to be packaged. Barrier properties are stressed. The applications in the food, beverage, chemical, and cosmetic industries are included. (Contains 49 citations fully indexed and including a title list.)

PB81-871931 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Regulations in the Packaging Industry. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 215p

This bibliography contains citations concerning the regulations of the packaging industry. FDA and

EPA guidelines and regulations relating to packaging and printing materials are considered. EEC regulations are also discussed. (Contains 136 citations fully indexed and including a title list.)

13E. Couplings, Fittings, Fasteners, and Joints

CONF-810203-13 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Solidification Behavior and Microstructural Analysis of Austenitic Stainless Steel Laser Welds.
S. A. DaVid, and J. M. Vitek. 1981, 8p
Contract W-7405-ENG-26
110. annual meeting of the AIME, Chicago, IL, USA, 22 Feb 1981.

Solidification behavior of austenitic stainless steel laser welds has been investigated with a high-power laser system. The welds were made at speeds ranging from 13 to 60 mm/s. The welds sowed a wide variety of microstructural features. The ferrite content in the 13-mm/s weld varied from less than 1% at the root of the weld to about 10% at the crown. The duplex structure at the crown of the weld was much finer than the one observed in conventional weld metal. However, the welds made at 25 and 60 mm/s contained an austenitic structure with less than 1% ferrite throughout the weld. Microstructural analysis of these welds used optical microscopy, transmission electron microscopy, and analytical electron microscopy. The austenitic stainless steel welds were free of any cracking, and the results are explained in terms of the rapid solidification conditions during laser welding. (ERA citation 06:023899)

DOE/ET/12313-T3 PC **A03**/MF **A01**
Colorado School of Mines, Golden. Dept. of Metallurgical Engineering.
CSM-3.2.2: Characterizing and Improving the Toughness of Thick-Sectioned 2-1/4 Cr-1Mo Electroslag Weldments.
G. R. Edwards, and R. H. Frost. 1980, 29p
Contract AS05-78ET12313

The electroslag welding process produces large single pass welds by consuming a wire electrode in an ohmically heated flux pool. The process has been particularly appealing for thick-section welding because of its high deposition rate. The welding potential and electrode velocity control the deposition rate, heat input, and thermal history of the heat affected zone. The electrode polarity, current density, and flux and metal compositions control electrochemical reactions which have a dominant influence on the weld metal chemistry. The post weld heat treatment strongly affects the final mechanical properties of the weldment, especially in 2-1/4 Cr-1Mo steel. The objective of this program is to characterize the effects of process variables, chemical variables, and post weld heat treatment, and to apply straight-foreword metallurgical knowledge in optimizing the properties of 4-inch thick 2-1/4 Cr-1Mo steel electroslag weldments. (ERA citation 06:023905)

13F. Ground Transportation Equipment

AD-A101 066/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Cold-Air Performance of Compressor-Drive Turbine of Department of Energy Upgraded Automobile Gas Turbine Engine. I. Volute-Manifold and Stator Performance.
Technical memo.,
Richard J. Roelke, and Jeffrey E. Haas. Jun 81, 18p NASA-TM-81932-1, NASA-E-572-1, USAAVRADCOM-TR-80-C-20-1, DOE-NASA/1011-34-1
Contract EC-77-A-31-1011

The aerodynamic performance of the inlet manifold and stator assembly of the compressor-drive turbine was experimentally determined with cold air as the working fluid. The investigation included measurements of mass flow and stator-exit fluid torque as well as radial surveys of total pressure and flow angle at the stator inlet and annulus surveys of total pressure and flow angle at the stator exit. The stator-exit aftermixed flow conditions and overall stator efficiency were obtained and compared with their design values and the experimental results from three other stators. In addition, an analysis was made to determine the constituent aerodynamic losses that made up the stator kinetic energy loss. (Author)

DOE/ET/15397-T4 PC **A02**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Technical Progress Report for Application of Numerical Simulation Methodology to Automotive Combustion.
Mar 81, 17p
Contract AC04-79ET15397

This report represents the third quarterly technical progress report for a program entitled, Application of Numerical Simulation Methodology to Automotive Combustion. The goal of the program is to develop, validate, demonstrate and apply a numerical simulation methodology for incylinder reactive flows in internal combustion engines. Previous work on this contract involved the initial development and validation of a finite difference based simulation model for time dependent axisymmetric flows which includes: a generalized coordinate system for arbitrary mesh design and treatment of complex and time dependent boundaries; multiple and interacting chemical species; coupled swirl flow velocity component; and two-equation turbulence closure. In its various stages of development, the model has been used to simulate numerous engine-related problems for validation and demonstration purposes. The technical effort during the current reporting period has concentrated on: reactive flow model development, test and parametric study calculations; engine simulation code clean-up, restructuring and documentation; and fuel injection/droplet model development. Results of these studies are discussed. (ERA citation 06:023822)

PB81-200115 PC**$30.25**/MF**$5.50**
Caterpillar Tractor Co., Peoria, IL.
Application for Certification 1981 Model Year Heavy-Duty Engines - Caperpillar.
1981, 503p EPA/460-A-81-27
See also PB81-200123, and PB80-100795.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200123 PC**$18.50**/MF**$4.75**
Cummins Engine Co., Inc., Columbus, IN.
Application for Certification 1981 Model Year Heavy-Duty Engines - Cummins.
1981, 270p EPA/460-A-81-28
See also PB-287 059, PB81-200115, and PB81-200131.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200131 PC**$73.00**/MF**$7.75**
International Harvester Co., Fort Wayne, IN.
Application for Certification 1981 Model Year Heavy-Duty Engines - International Harvester.
1981, 1356p EPA/460-A-81-29
See also PB80-188915, PB81-200123, and PB81-200149.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200149 PC**$19.50**/MF**$5.00**
Isuzu Motors America, Inc., Southfield, MI.
Application for Certification 1981 Model Year Heavy-Duty Engines - Isuzu.
1981, 290p EPA/460-A-81-30
See also PB80-100803, PB81-200131, and PB81-200156.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200156 PC**$27.75**/MF**$5.25**
Mack Trucks, Inc., Hagerstown, MD.
Application for Certification 1981 Model Year Heavy-Duty Engines - Mack Trucks.
1981, 451p EPA/460-A-81-31
See also PB80-100811, PB81-200149, and PB81-200164.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include expla-

nations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200164 PC**$15.75**/MF**$4.75**
Mitsubishi Motors Corp., Tokyo (Japan).
Application for Certification 1981 Model Year Heavy-Duty Diesel Engines - Mitsubishi.
1981, 201p EPA/460-A-81-32
See also PB80-142615, PB81-200156, and PB81-200172.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200172 PC**$20.00**/MF**$5.00**
SAAB-SCANIA of America, Inc., Orange, CT.
Application for Certification 1981 Model Year Heavy-Duty Engines - Saab-Scania.
1981, 296p EPA/460-A-81-33
See also PB-287 037, PB81-200164, and PB81-200180.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200180 PC**$39.25**/MF**$6.00**
General Motors Proving Ground, Milford, MI.
Application for Certification 1981 Model Year Heavy-Duty Diesel Engines - General Motors.
1981, 681p EPA/460-A-81-35
See also PB81-200172, and PB81-166423.
Also available in set of 8 reports PC$230.00/MF$16.00, PB81-200107.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200206 PC**$60.00**/MF**$7.00**
Volkswagen of America, Inc., Ann Arbor, MI.
Application for Certification 1981 Model Year Light-Duty Vehicles - Audi.
1981, 1096p EPA/460-A-81-18
See also PB80-142524, and PB81-200214.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200214 PC**$10.50**/MF**$4.50**
General Motors Proving Ground, Milford, MI.
Application for Certification 1981 Model Year Light-Duty Vehicles - General Motors.
1981, 109p EPA/460-A-81-19
See also PB81-165979, PB81-200206, and PB81-200222.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200222 PC**$58.00**/MF**$7.25**
Isuzu Motors America, Inc., Southfield, MI.
Application for Certification 1981 Model Year Light-Duty Vehicles - Isuzu.
1981, 1059p EPA/460-A-81-20
See also PB-287 041, PB81-200214, and PB81-200230.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200230 PC**$60.25**/MF**$7.00**
Mercedes-Benz of North America, Inc., Montvale, NJ.
Application for Certification 1981 Model Year Light-Duty Vehicles - Mercedes-Benz.
1981, 1102p EPA/460-A-81-22
See also PB80-188964, PB81-200222, and PB81-200248.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200248 PC**$77.00**/MF**$7.75**
Peugeot Motors of America, Inc., Lyndhurst, NJ.
Application for Certification 1981 Model Year Light-Duty Vehicles - Peugeot.
1981, 1438p EPA/460-A-81-23
See also PB80-188980, PB81-200230, and PB81-200255.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200255 PC**$56.75**/MF**$6.75**
British Leyland Motors, Inc., Leonia, NJ.
Application for Certification 1981 Model Year Light-Duty Vehicles - Jaguar Rover Triumph, Inc. (British Leyland).
1981, 1031p EPA/460-A-81-21
See also PB-294 370, PB81-200248, and PB81-200263.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures,

service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200263 PC**$37.50**/MF**$6.00**
Rolls Royce Motors, Inc., Lyndhurst, NJ.
Application for Certification 1981 Model Year Light-Duty Vehicles - Rolls Royce.
1981, 650p EPA/460-A-81-24
See also PB80-142466, PB81-200255, and PB81-200271.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200271 PC**$12.50**/MF**$4.50**
Toyota Motor Co. Ltd., Secaucus, NJ.
Application for Certification 1981 Model Year Light-Duty Vehicles - Toyota.
1981, 147p EPA/460-A-81-25
See also PB81-166043, PB81-200263, and PB81-200289.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200289 PC**$96.25**/MF**$9.00**
Volkswagen of America, Inc., Ann Arbor, MI.
Application for Certification 1981 Model Year Light-Duty Vehicles - Volkswagen.
1981, 1824p EPA/460-A-81-26
See also PB80-142516, PB81-200271, and PB81-200297.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-200297 PC**$70.00**/MF**$7.25**
American Honda Motor Co., Inc., Gardena, CA.
Application for Certification 1981 Model Year Motorcycle - Honda.
1981, 1300p EPA/460-A-81-34
See also PB-287 030, and PB81-200289.
Also available in set of 10 reports PC$520.00/MF$32.00, PB81-200198.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

PB81-210833 PC **A05**/MF **A01**
National Highway Traffic Safety Administration, East Liberty, OH. Vehicle Research and Test Center.
Light Truck Side Structure Evaluation. Volume I: Overview and Conclusions.
Final rept. Jun 80-Feb 81,
Michael W. Monk, and Donald Willke. Feb 81, 87p DOT-HS-805 835, SRL-26-VOL-1
See also Volume 2, PB81-210841.

A study was conducted to compare the side structural components of three lightweight pickup trucks with those of a VW Rabbit Sedan. Under previous Agency contracts, a series of side structural modifications had been performed on the sedan resulting in improved compartment integrity. It was desired to know if the same types of structural modifications would be applicable to the lightweight pickup trucks. The pickup trucks selected were: 1978 Chevrolet Luv, 1978 Ford Courier, and 1980 VW Rabbit Pickup. The occupant seating position is documented for each vehicle. The main structural elements are documented and compared. Finally the applicability of the proposed upgrade of Federal Motor Vehicle Safety Standard No. 214 'Side Impact Protection' is discussed.

PB81-210841 PC **A08**/MF **A01**
National Highway Traffic Safety Administration, East Liberty, OH. Vehicle Research and Test Center.
Light Truck Side Structure Evaluation. Volume II: Documentation of Occupant Seating Position and Structural Components.
Final rept. Jun 80-Feb 81,
Michael W. Monk, and Donald Willke. Feb 81, 162p DOT-HS-805 836, SRL-26-VOL-2
See also Volume 1, PB81-210833.

A comparison of the occupant seated position and side structural details of the VW Rabbit Sedan and three lightweight pickup trucks was done. The comparison was accomplished using photographs of a seated 50th percentile male dummy and of the structural components of the vehicles along with a narrative description of the connections and reinforcements. The three pickup trucks are: 1978 Chevrolet Luv, 1978 Ford Courier, and 1980 VW Rabbit Pickup.

PB81-214181 PC **A03**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Crash Tests of Sharply Curved Light-Post Guiderail.
Research rept.,
James E. Bryden, and Kenneth C. Hahn. Jul 80, 36p RR-83, FHWA/NY/RR-80/83
See also report dated Jun 80, PB80-213721.

Cables, W-beam, and box-beam guiderail on S 3x5.7 posts were crash tested on 50- and 100-ft radius curves. Head-on impacts on these sharply curved barriers produced much different results than standard angled impacts on tangent barriers. For the cable and W-beam barriers, deflections were much greater than for standard impacts, but decelerations remained low. For box-beam, deflections increased only slightly, but decelerations were greater.

PB81-215154 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A Survey Among Lorry Drivers About the Striking of Low Bridges,
Margaret Galer. c1981, 24p TRRL-SUPPLEMENTARY-633
Also pub. as ISSN-0305-1315.

An interview survey of 497 drivers of high vehicles was conducted in 1978. Lorry drivers' knowledge of the overall height of the vehicle plus any load being carried at the time was compared with actual height measurements. Although 95 percent of drivers interviewed claimed to know the height of their vehicles, only 185 drivers were accurate to within 3 in. either side of the correct height and 73 drivers were underestimating their vehicles' height by more than 3 in. Lorry drivers' knowledge of road signs relating to low bridges was also investigated. Seventy-two percent of lorry drivers were fully or acceptably correct in their understanding of the road sign 'Headroom at hazard ahead', but only 31 per cent were correct in their understanding of the road sign 'Available width of headroom at hazard'. (Copyright (c) Crown Copyright 1981.)

PB81-215261 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Environmental Issues in Transportation: Analysis, Noise, and Air Quality,
Louis F. Cohn, Gerardo G. Ciemena, Kenneth R. Agent, Jerry A. Reagan, and Glenda J. Sisson. 1981, 63p TRB/TRR-789, ISBN-0-309-03203-2
Library of Congress catalog card number. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

The 10 papers in this report deal with the following areas: evolution of environmental analysis at the state transportation department level; empirical relationship between mesoscale carbon monoxide concentrations and areal vehicular emission rates; evaluation of the federal highway administration procedure for highway traffic noise prediction; comparison of Leq(h) and Ldn as descriptors of highway traffic noise; comparison of sound-level predictions by SNAP 1.0 and STAMINA 1.0 highway traffic-noise-prediction programs; STAMINA 1.0 experiences on the Dulles Access Highway Extension Project; role of plant materials in traffic noise control; noise abatement and public policy decisions: a case study -I-440 in Nashville; inventory and priority rating of potential type II noise-abatement sites in Georgia; and, simplified traffic-noise-prediction model for transportation and land use planning.

PB81-215899 PC **A06**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
EPA Evaluation of the Gastell Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act.
Technical rept.,
Edward Anthony Barth. Feb 81, 123p EPA-AA-TEB-511-81-8

This document announces the conclusions of the EPA evaluation of the 'Gastell' device under provisions of section 511 of the Motor Vehicle Information and Cost Savings Act. On November 11, 1979, the EPA received a request from Automotive Devices, Inc. for evaluation of a fuel saving device termed 'Gastell'. This device is designed to provide the vehicle operator visual and audible indications of inefficient engine operating conditions so

that the fuel-conscious drivers can modify their driving habits to obtain improved efficiency. An evaluation has been made and the results are described in this report.

PB81-216582 PC **A06**/MF **A01**
JHK and Associates, Alexandria, VA.
Evaluation of Priority Treatments for High Occupancy Vehicles.
Final rept. May 76-Jun 80,
Morris J. Rothenberg, and Donald R. Samdahl.
Jan 81, 125p FHWA/RD-80/062
Contract DOT-FH-11-8242
See also PB-270 529.

This report presents evaluation summaries of 27 priority treatment projects for high occupancy vehicles (HOV's). The projects evaluated consist of contraflow; concurrent flow and physically separated HOV lane treatments on both grade separated and surface street facilities. In addition, priority HOV ramps, bus signal preemption, priority HOV parking facilities and toll pricing strategies are covered. The evaluations include project descriptions, locations and characteristics plus presentations of key project impacts. Summary tables and discussions compare these findings with updated characteristics and impacts of 14 additional projects evaluated in an earlier study document, Priority Treatment for High Occupancy Vehicles: Project Status Report (March 1977). A detailed bibliography is cross-referenced to each project. These results provide a base from which to evaluate ongoing and future HOV priority treatments.

PB81-217473 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of Restorative Maintenance Retesting of Passenger Cars in Detroit.
Technical rept.,
Gary T. Jones. Jan 79, 41p EPA-AA-TEB-79-5

The report describes the results of an exhaust emission testing program in which twenty-seven vehicles received prescribed sequences of testing, corrective maintenance, and retesting at different time intervals. The purpose of this program was to study the effects of age and mileage on emission levels, control system durability and ultimate restorability.

PB81-217952 PC **A13**/MF **A01**
National Highway Traffic Safety Administration, East Liberty, OH. Safety Research Lab.
Side Impact Sled and Padding Development.
Final rept. Jun 79-Feb 81,
Michael W. Monk, and Lisa K. Sullivan. Feb 81, 288p SRL-17, DOT-HS-805-889

A study was conducted to devise and fabricate a HYGE sled buck which could be used to simulate oblique side impact collisions. Once completed the buck was demonstrated by simulating the occupant and side door interactions of two separate laboratory car-to-car impacts. The degree of success of these two simulations is discussed. Following the simulations, the sled buck was used to select padding materials which appeared promising for occupant protection in side impact collisions. The selection criteria and results are presented.

PB81-218406 PC **A07**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Longitudinal Control and Reliability Project. Volume I. Project Summary.
Final rept.,
W. Womack. Jun 79, 147p OTIS-TTD-VLCR-072, UMTA-IT-06-0148-79-10
Contract DOT-UT-70048
See also Volume 2, Part B, PB80-138142.

The Automated Guideway Transit Technology (AGTT) program is a comprehensive, critical technology development program, and it is oriented toward the development of systems analyses and system elements that may be used in advanced urban transportation systems. The Vehicle Longitudinal Control and Reliability (VLCR) project is vital to the AGTT program; it aims to provide the basis for improving the effectiveness of future AGT systems and for insuring that the best VLCR approaches are identified, documented, and demonstrated. The project emphasizes the improvement of the performance of longitudinal control subsystems. The project involved the development, design, and demonstration of a moving-block longitudinal control system; the development of techniques for reliability enhancement; and a study of automatic entrainment and platooning concepts. The final report of the VLCR project consists of 8 separate volumes. This volume, the Project Summary, provides an overview of the entire VLCR project and presents the significant findings and achievements. The detail analysis and design results are fully described in each of the volumes of the final report. This volume contains all the salient information including the goals and objectives, evaluation of existing technology, major results and achievements, discussion of promising concepts, descriptions of the major features of the test program, and a commentary on the project results.

PB81-219032 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
EPA Evaluation of the Gas Meiser I Under Section 511 of the Motor Vehicle Information and Cost Savings Act.
Technical rept.,
Edward Anthony Barth. May 81, 21p EPA-AA-TEB-511-81-1

This document announces the conclusions of the EPA evaluation of the 'Gas Meiser I' device under provisions of section 511 of the Motor Vehicle Information and Cost Savings Act. On December 17, 1980, the EPA received a request from Gas Meiser I. This device is claimed to '. . .increase fuel economy by pre-heating the fuel.' The device consists principally of a gasoline hose wrapped around the vehicles's upper radiator hose.

PB81-219198 PC **A04**/MF **A01**
Mueser, Rutledge, Johnston and DeSimone, New York.
Landover Metrobus Garage Facility; Subsurface Investigation.
Rept. no. 9.
9 Jun 81, 53p MRJD-81-174
Contract WMATA-3Z725S
Prepared in cooperation with Deleuw, Cather and Co., Washington, DC.

Results are summarized herein of 36 test borings made at the site of the planned Landover Metrobus Garage Facility which is located adjacent to Pennsy Drive, approximately 1500 feet northeast of the existing Landover Metro station in Prince Georges County, Maryland. The report includes a group of geologic sections at the location of the planned bus garage structure and bus parking lot. Also included are logs of the test borings, results of laboratory tests on soil samples and comments on potential design and construction problems.

PB81-219347 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Inspection and Maintenance Staff.
A Study of the Effectiveness of Mechanic Training for Vehicle Emissions Inspection and Maintenance Programs.
Technical rept.,
R. Bruce Michael. Apr 81, 35p EPA-AA-IMS-81-11

This report describes a study to determine if a short, practical training course for emissions repairs has a supplementary emission reduction and fuel economy benefit to an inspection and maintenance program. The study was performed in the early part of 1980 in Portland, Oregon. Two matched samples of 21 vehicles each were sent to ten repair facilities before and after the facilities received training. The experiment was blind in that the ten repair facilities did not know that the study was in progress or that the 42 vehicles were in any way connected with EPA. The training course used was a 16 hour course in repairing vehicles which fail an idle emissions test. Vehicles were tested before and after repairs on the Federal Test Procedure and various short tests for emissions and fuel economy. Contractor laboratory personnel then attempted to restore the vehicles to their specifications and vehicles were retested.

PB81-220246 PC **A02**/MF **A01**
Ricardo and Co. Engineers (1927) Ltd., Shoreham-by-Sea (England).
Predictions of the Performance and Exhaust Emissions Produced by Small Light Duty Vehicles Powered by DI and IDI Diesel Engines.
Final rept.
Feb 81, 15p EPA-460/3-81-011

This report describes an exercise in which a computer simulation program was used to predict the likely performance, fuel economy and exhaust emission levels of light duty vehicles weighing from 1000 to 2000 lb. when powered by naturally aspirated diesel engines of 0.8 litre displacement having direct injection (DI) and indirect injection (IDI) combustion systems. It was assumed that the vehicles were fitted with an efficient continuously variable transmission.

PB81-221939 PC **A07**/MF **A01**
South Coast Technology, Inc., Dearborn, MI.
Multipiece Rims for Trucks, Buses, and Trailers-Economic Effects Caused by Further Regulation of Rims in Standard No. 120.
Final rept. Feb-Aug 80,
R. W. Gaines. 6 Feb 81, 128p DOT-HS-805 902
Contract DOT-HS-9-02111

Data gathered over an extended period of time indicate that multipiece truck and bus wheel rims have caused accidents resulting in injury and death. This study was carried out for the NHTSA to determine the potential cost effectiveness that would result should the use of multipiece rims be phased out of production by rulemaking action. The study identifies one time conversion costs, added cost to truck users and the feasibility of a 5-10 year phase-out program. These costs are then used to arrive at a cost effectiveness factor in terms of reduction in incident that could occur. The differential incident rate between multipiece rims and single piece wheels plays a key role in establishing the cost effectiveness.

PB81-226680 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
EPA Evaluation of the ULX-15 and ULX-15D Under Section 511 of the Motor Vehicle Information and Cost Savings Act.
Technical rept.,
Edward Anthony Barth. May 81, 25p EPA-AA-TEB-511-81-4

On January 19, 1981, the EPA received a request from Fuelteck Corporation for evaluation of a fuel saving device termed ULX-15 and ULX-15D. These devices are fuel additives that are claimed to improve gasoline and diesel engine combustion and thereby increase fuel economy. This document announces the conclusions of the EPA evaluation of the ULX-15 and ULX-15D additives under provisions of section 511 of the Motor Vehicle Information and Cost Savings Act.

UCRL-15353 PC **A03**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Use of Elastomers in Regenerative Braking Systems.
L. O. Hoppie. 1981, 28p CONF-810648-1
Contract W-7405-ENG-48
Rubber division meeting of the American Chemical Society, Minneapolis, MN, USA, 1 Jun 1981.

The results of research into the storage of potential energy as strain energy in elastomers are presented. The evolution of the preferred stressing scheme is described, and test results on full-size elastomeric energy storage units sized for an automotive regenerative braking system application are presented. The need for elastomeric material improvements is also discussed. (ERA citation 06:023855)

13G. Hydraulic and Pneumatic Equipment

AD-A100 883/8 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Development of A Fluidic, Hydraulic Servovalve.
Final rept. 1977-1980,
D. N. Wormley, D. Lee, and K-M. Lee. Feb 81, 58p HDL-CR-81-216-1, HDL-80-1
Contract DAAG39-77-C-0216

This study focuses upon the analysis, design and experimental evaluation of a hydraulic servovalve constructed from laminar proportional fluid amplifiers and resistance feedback elements. A servovalve has been developed in which the pressure/flow characteristics can be contoured to match a specific application through appropriate design of the proportional amplifiers and selection of the feedback elements. A set of design equations have been derived to select the appropriate feedback elements. From the design procedures, two valve configurations have been constructed and tested. Experimental evaluations of the two configurations in terms of static pressure and flow gains and dynamic response have agreed closely with analyses. (Author)

PB81-871139 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fluidic Stream Interaction Devices. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 74p

This bibliography contains citations concerning the design, characteristics, performance, testing, and applications of various types of fluidic stream interaction devices and systems, especially fluidic amplifiers. Some attention is given to theoretical and experimental analyses of these devices and systems. (Contains 61 citations fully indexed and including a title list.)

PB81-872442 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pneumatic Transport of Solids. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 127p

Citations in this bibliography cover theoretical and experimental studies and analyses and practical commercial or industrial applications of pneumatic conveying of solids of various compositions, sizes, and concentrations. Consideration is given to the design, characteristics, and performance of mechanical-pneumatic systems, equipment, and materials. (Contains 112 citations fully indexed and including a title list.)

13H. Industrial Processes

BDX-613-2306 PC **A04**/MF **A01**
Bendix Corp., Kansas City, MO.
Progress in the Battle with the Burr.
L. K. Gillespie. Apr 81, 72p CONF-7910229-1
Contract AC04-76DP00613
International deburring conference, Cleveland, OH, USA, Oct 1979.

Although US industry still spends more for removing burrs than it needs to, significant improvements in deburring are developing. Standards for burrs are now in reasonably common use at many companies. The mechanisms by which burrs form and by which one can predict their properties have been documented, and some deburring economics have been described. Advances in a number of processes have emerged within the past two years, and the entire subject of deburring has been receiving greater emphasis in most high-technology countries than before. (ERA citation 06:024000)

DOE/ET/26214-T1 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Evaluation of Laser Welding Techniques for Hydrogen Transmission. Final Report, September 1977-November 1979.
J. Mucci. May 80, 85p COO-4355-11
Contract AC02-77ET26214

This program was established to determine the feasibility of laser beam welding as a fabrication method for hydrogen transmission and is a precursor in the effort to systematically provide the technological base necessary for large-scale, economic pipeline transmission of fuel for a hydrogen energy system. The study contributes to the technology base by establishing the effect of conventional weld processes and laser beam welding on the mechanical properties of two classes of steels in an air and high pressure gaseous hydrogen environment. Screening evaluation of the tensile, low-cycle fatigue and fracture toughness properties and metallurgical analyses provide the basis for concluding that laser beam welding of AISI 304L stainless steel and ASTM A106B carbon steel can produce weldments of comparable quality to those produced by gas-tungsten arc and electron beam welding and is at least equally compatible with 13.8 MPa (2000 psig) gaseous hydrogen environment. (ERA citation 06:022269)

DOE/OR/13511-T1 PC **A02**/MF **A01**
Westinghouse Electric Corp., Tampa, FL. Nuclear Equipment Div.
Development of Automated Welding Process for Field Fabrication of Thick Walled Pressure Vessels. Second Quarterly Report, FY 1981.
U. A. Schneider. 1981, 6p
Contract AC05-78ET13511

Progress is reported on Task I (review of welding processes), Task II (laboratory adaptation of the GTAW-HW narrow groove process to the vertical and horizontal welds), Task III (8-in. field demonstration/qualification welds in vertical and horizontal positions), and Task IV (welding procedure handbook). (ERA citation 06:022051)

LA-UR-81-1316 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
New Era for Ultrasonic Impact Grinding.
N. C. Calkins. 1981, 12p
Contract W-7405-ENG-36

New piezoelectric efficiencies allow impact grinding to progress up to 900 watts and above. This previously little known machining method takes on new importance in cutting and contouring extremely hard refractories and refractory metals such as boron carbide. (ERA citation 06:022422)

N81-26452/5 PC **A04**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa).
Mini-Seminars on Machining Technology.
May 80, 74p CSIR-TSD-0002/80, ISBN-0-7988-1774-1
Proceedings of Seminars Held in Pretoria, 26 Jun. 1980, 6 Aug. 1980, 10 Sep. 1980, 15 Oct. 1980 and 6 Nov. 1980.

No abstract available.

PB81-211880 PC **A07**/MF **A01**
Schock (Harvey), Haddonfield, NJ.
Product Certification in the Federal Government,
Harvey Schock. Feb 81, 146p
Contract NB80-NAAE-3112

Application of product certification concepts to government use are studied and categorized. Eleven different types of Federal applications and certification concepts are identified from government purchases use to government regulation use. Subjects to be addressed in assessing a product certification system for government use are presented, along with detailed descriptions of a number of certification systems now in use.

PB81-216442 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Measurement Technology: A Manual Wafer Probe Station for an Integrated Circuit Test System,
G. P. Carver, and W. A. Cullins. May 81, 22p
NBS-SP-400-68

This report describes the design of a manual wafer probe station for wafer-level testing of integrated circuits, test structures, and test patterns. The station includes a translatable vacuum chuck, a probe assembly which can be used for probe cards or individual micropositioner-mounted probes, and a microscope holder. Except for a few components which are commercially available, construction details are provided for all parts.

PB81-217143 PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, Saint-Etienne (France).
Noise in Boilerworks: A Survey (Bruit dans les Ateliers de Chaudronnerie: Enquete).
Final rept.,
29 May 80, 45p
Text in French.

The study of noises in boilerworks, carried out under the auspices of the Mechanical Industries Technical Center, Saint-Etienne, reports on the current situation and is based on a detailed letter-questionnaire sent to 2391 enterprises throughout France. The 244 replies, from around sixty departments, represent 10 percent of the enterprises surveyed (or 11,000 workers) and suggests the extent of interest in the subject. One shop in six has noise absorbant walls or roof. The author suggests that improvements are possible in this field. Noisiest machines are metal cutters, grinders, molders. Among the least noisy operations are riveting and heating. Thirty percent of the personnel surveyed complained of noise; 10 percent of the neighborhood personnel complained. Concerning use of individual noise protective devices, there were three equal groups of responses--no protection; 1-10 percent of the workers wore them; a third group, 11-100 percent. A total of twenty-five percent of the responding workers wore them. Forty-six percent of the responding enterprises had either taken anti-noise measures or were to take them. Most frequent measures were use of noise absorbing materials, individual protective devices, and other technological measures.

PB81-218000 PC **A03**/MF **A01**
Quantronix Corp., Smithtown, NY.
Dual Wavelength Laser Thermal Processing of Semiconductors.
Final rept.,
Martin G. Cohen, Kuo-Ching Liu, and Robert A. Kaplan. Jun 80, 46p NSF/RA-800540
Grant NSF-DAR79-17090
Color illustrations reproduced in black and white.

The annealing of ion-implantation damage in semiconductors by laser irradiation is optimized by employing a dual wavelength laser source and tailoring the time delay between pulses at the two wavelengths. This takes advantage of the strong temperature dependence of the absorption coefficient for the initially less-strongly absorbed wavelength. A solid-state laser emitting high-intensity pulses at 0.53 millimicrons and 2.06 millimicrons was used in conjunction with an optical fiber delay line to experimentally study the annealing characteristics of an arsenic-implanted silicon solar cell wafer. By varying the length of fiber and varying the delay between pulses of the two wavelengths, it was determined that at 25 nanoseconds delay, the sample surface is preheated by the 0.53 millimicron radiation. These results are in agreement with a theoretical model based on melting and liquid phase epitaxial regrowth. Calculations based on this model are presented.

PB81-219628 PC **A03**/MF **A01**
Hughes Research Labs., Malibu, CA.
Measurement Technology for Critical Ion Implantation Parameters.
Final rept. Apr 75-Jun 80,
R. G. Wilson. Jun 81, 45p NBS-GCR-81-325
Contract NBS-5-35801

Practical information and experimental data are summarized on a research project on the control

of ion-implantation doping to achieve accurate implantation doses and profiles.

PB81-807075 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metal Drawing. 1964-June, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 81.
Jul 81, 132p
Supersedes PB80-808116, and NTIS/PS-79/0388.

Citations include application of ultrasonic energy, effects of friction, lubricants and lubrication, and deformation. (This updated bibliography contains 125 citations, 7 of which are new entries to the previous edition.)

PB81-871188 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Welding of Pipelines and Offshore Drilling Platforms. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 106p

The underwater welding of offshore drilling platforms and submerged pipelines is discussed. Problems associated with heat transfer, and selection of electrode materials, are emphasized. Other topics include explosive and remote controlled, as well as hyperbaric, welding. The properties of underwater welds as a function of operating parameters are also discussed. (Contains 163 citations fully indexed and including a title list.)

PB81-871196 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Welding of Pipelines and Offshore Drilling Platforms. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 65p

The underwater welding of offshore drilling platforms and submerged pipelines is discussed. The development of explosive welding techniques for pipeline connection and repair is emphasized, as is hyperbaric welding and inert gas shielded welding. (Contains 65 citations fully indexed and including a title list.)

PB81-871949 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Die Cutting of Packaging and Labeling Materials. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 258p

This bibliography from world reports describes the various techniques of die cutting of paper and fibrous materials. Some of the techniques mentioned include reciprocal die cutting, rotary die cutting, rotogravure die cutting and laser die board cutting. (Contains 181 citations fully indexed and including a title list.)

PB81-872046 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lapping Techniques for the Preparation of Polished Surfaces. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 58p

Techniques for the polishing or lapping of metallographic specimens, as well as the finishing of metal surfaces on metal parts are considered. Objects ranging from bearings to large machine shafts are included. Emphasis is placed on wear and abrasive resistance. (Contains 88 citations fully indexed and including a title list.)

PB81-872186 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Treatment of Metal Surfaces for Reducing Frictional Forces. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 93p

Methods for treating bearing material to reduce frictional losses are discussed. Various heat treatment procedures are considered, including surface hardening. The effects of treatments on metal fatigue, corrosion and plastic deformation are also presented. (Contains 84 citations fully indexed and including a title list.)

PB81-872400 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hot Stamping: Printing, Decorating, and Labeling. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 77p

Processes and materials involved in hot stamping are considered in this bibliography. Polymers adapted for foil use, such as urethanes, acrylics, acrylated urethanes, polyesters, cellulosics, and vinyl copolymers are mentioned. Machinery and dies are also discussed. (Contains 61 citations fully indexed and including a title list.)

13I. Machinery and Tools

N81-26459/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Surface Geometry of Circular Cut Spiral Bevel Gears.
R. L. Huston, and J. J. Coy. 1981, 23p NASA-TM-82622, E-873
Grant NSG-3188
Presented at the NASA-Avradcom Symp. On Advan. Power Transmission Technol., Cleveland, 9-11 Jun. 1981 and Proposed for Presentation at the Design Eng. Tech. Conf., Hartford, Conn., 20-23 Sep. 1981; Sponsored by the American Society of Mechanical Engineers.

The tooth surface principal radii of curvature of crown (flat) gears were determined. Specific results are presented for involute, straight, and hyperbolic cutter profiles. It is shown that the geometry of circular cut spiral bevel gears is somewhat simpler than a theoretical logarithmic spiral bevel gear.

PAT-APPL-6-216 585 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Ring Bar Grizzly.
Patent Application,
Allan T. Fisk. Filed 15 Dec 80, 9p PB81-222648, DOCKET/MIN-2997
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to a ring bar grizzly used as a materials handling device to enable the jam-free transfer of loose rocks or other materials at the discharge end of a generally horizontal conveyor. Normally, this ring bar grizzly is used in conjunction with a horizontally fed machine, such as a rotary jaw rock crusher, or simply to affect the horizontal transfer of material from one generally horizontal conveyance to another. Several loosely fitting rings are mounted on a static bar which is located between the conveyor and the crusher and which spans the width of the inlet to the crusher. Jams which would normally take place between the conveyor and the crusher rotor are eliminated because the freely suspended rings support the medium and large size pieces of rock in the feed, allowing them to pass over the transfer point and into the crusher. Fines and undersized rocks are allowed to drop freely through the ring bar grizzly.

PATENT-4 229 909
Not available NTIS
Department of Energy, Washington, DC.
Tool Grinding Machine.
Patent,
C. E. Dial. Filed 22 Mar 79, patented 28 Oct 80, 5p PAT-APPL-6-022 895
Supersedes PAT-APPL-6-022 895.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention relates to an improved tool grinding mechanism for grinding single point diamond cutting tools to precise roundness and radius specifications. The present invention utilizes a tool holder which is longitudinally displaced with respect to the remainder of the grinding system due to contact of the tool with the grinding surface with this displacement being monitored so that any variation in the grinding of the cutting surface such as caused by crystal orientation or tool thickness may be compensated for during the grinding operation to assure the attainment of the desired cutting tool face specifications. (ERA citation 06:023780)

PB81-871881 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Doctor Blades: Design, Construction and Applications. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 86p

The technical aspects of doctor blades and their uses are considered in this bibliography from world sources. Items discussed include blade designs, materials used, contact angles, dipping surfaces, and blade thickness, as well as printing applications. (Contains 60 citations fully indexed and including a title list.)

PB81-872129 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Die Cutters: Machinery and Accessories. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 121p

This bibliography describes machinery and equipment for die cutter technology. Design parameters of die cutters discussed include frames, widder gripper chains, non-stop interceptor as well as die making by lasers. (Contains 68 citations fully indexed and including a title list.)

PB81-872194 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Wear Characteristics and Lubrication of Journal Bearings. January, 1966-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Jul 81.
Jul 81, 89p

The wear characteristics and lubrication of journal bearings are discribed. The hydrodynamics of the bearing-lubricant interface is discussed in terms of coating processes designed to minimize wear and thermal degradation of the lubricant. (Contains 122 citations fully indexed and including a title list.)

13J. Marine Engineering

AD-A100 588/3 PC **A06**/MF **A01**
Coast Guard, Washington, DC. Office of Merchant Marine Safety.
Statistics of Casualties, 1979.
Dec 80, 106p Rept no. USCG-M-1-81
Proceedings of the Marine Safety Council.

The U.S. Coast Guard annually presents a statistical summary of commercial vessel casualties that were investigated by Coast Guard marine inspectors during the previous fical year. The public, in-

dustry, and the Coast Guard have used the findings of these investigations to establish standards and determine the need for legislation to improve the protection of safety of life and property at sea. This compilation includes statistical tables for 1963, 1965-71, and 1973-79.

AD-A100 656/8 PC **A09**/MF **A01**
Eclectech Associates, Inc., North Stonington, CT.
A Simulator Study of Deepwater Port Shiphandling and Navigation Problems in Poor Visibility.
Final rept.,
R. C. Cook, K. L. Marino, and R. B. Cooper. Jan 81, 190p EA-80-U-099, USCG-D-66-80
Contract DOT-CG-944467-A

The study used a ship's bridge simulator to investigate safety of navigation, the effect of navigation displays, and the effect of bridge personnel organization during low visibility approaches of a VLCC to a deepwater port complex. Experienced VLCC masters and mates, some team trained and team organized, performed over 90 simulated approaches to the Louisiana Offshore Oil Port (LOOP) using either radar, radar with added racons in the area an automatic radar plotting aid (ARPA), or an ARPA displaying fairway boundary lines. Three scenarios were examined: a landfall approach, coastwise approach, approach to pick up the mooring master, and a dead reckoning approach with degraded position information. Strategies which were chosen by the masters in their approaches are described in light of their effect on deepwater port safety. Conclusions derived from descriptive and statistical evidence of performance led to recommendations for relocating the mooring master pickup point, providing an anchorage for use by masters, and the placement and implementation of racons within the deepwater port area. Other recommendations advocate the use of special bridge procedures and navigation systems during port approaches, and further research into the effect of traffic separation or advisory schemes on deepwater port safety. Findings suggest that while approaches of VLCCs to an offshore deepwater port under conditions similar to those simulated are not deceptively difficult or inherently unsafe, there are opportunities to mitigate the potential for hazardous navigation and shiphandling problems. (Author)

AD-A100 759/0 PC **A07**/MF **A01**
Washington Univ., Seattle. Applied Physics Lab.
AEMT Wind Tunnel Test Data from University of Washington Venturi Tunnel.
Data rept.,
R. M. Hubbard. May 81, 141p Rept no. APL-UW-8014
Contract N00024-78-C-6018

A series of wind tunnel tests was conducted from 15 April 1979 to 14 June 1979 at the University of Washington's 3-ft Venturi tunnel to gather data relevant to the solution of a propulsion problem and to support a fin redesign effort for the Advanced Expendable Mobile Target (AEMT). This report outlines the test setups, describes the types of tests performed, and presents selected results. In addition, all of the raw data gathered during the tests are contained in an appendix. (Author)

AD-A100 832/5 PC **A06**/MF **A01**
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
Trawler Icing: A Compilation of Work Done at N.R.C. (Givrage des Chalutiers: Compilation des Recherches Effectuees au C.N.R.).
Mechanical engineering rept.,
J. R. Stallabrass. Dec 80, 113p DME-MD-56, NRC-19372
Summary in French.

This report collates and reviews the results of an eleven-year project on the icing of fishing trawlers. Initially the factors causing the icing of ships at sea are presented and some aspects of the physics of the icing process are discussed. Some simple icing tests on cylinders of various diameters are described. These were made in an icing wind tunnel and demonstrated the effects of air temperature and cylinder size of the resulting ice formations. Later, a number of possible methods for reducing the icing hazard were tested in the wind tunnel and at an outdoor test rig. Of the methods tested the most effective was an inflatable rubber de-icing blanket. Throughout the project, icing report forms were distributed to vessels operating out of Canadian east coast ports. The data obtained by this means has helped to establish the types of weather systems responsible for icing conditions, the geographical extent of the occurrence of icing, and statistics on the severity of icing encounters in the study area. Appendices present simplified formulae for the droplet collection efficiency of cylinders and rectangular bodies, the derivation of an analytical expression for the rate of ice build-up on fishing trawlers, and a bibliography of ship icing. (Author)

AD-A100 875/4 PC **A02**/MF **A01**
Consiglio Nazionale delle Ricerche, Venice (Italy). Ist. per lo Studio della Dinamica delle Grandi Masse.
Wave Response of a Spar Buoy with and Without a Damping Plate,
Luigi Cavaleri, and Erik Mollo-Christensen. 1981, 8p
Pub. in Ocean Engineering, V8 p17-24 1981. Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.

No abstract available.

AD-A100 885/3 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Calculation of Natural Vibration Frequencies and Transient Response of Partially Submerged, Supercavitating Marine Propellers.
Final rept.,
Richard V. Raetz, and Gordon C. Everstine. Jun 81, 65p Rept no. DTNSRDC-81/051

Procedures are presented whereby natural vibration and transient response analyses of partially submerged, supercavitating marine propellers may be calculated by means of a standard NASTRAN structural analysis program. The use of these procedures was demonstrated by analyses of an existing propeller, for which some experimental data were available. Results were comparable only in a limited way, but peak calculated dynamic stresses were of the same order of magnitude as those observed experimentally, and were apparently more then twice the magnitude of equivalent static stresses. (Author)

AD-A100 990/1 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Arctic Alaska and Icebreaking: An Assessment of Future Requirements for the United States Coast Guard.
Master's thesis,
Jeffrey M. Garrett. Mar 81, 189p

Technological advances, increased energy demand, and political events have coalesced in recent years to make the extraction of hydrocarbon energy resources in the arctic attractive. U. S. efforts in this direction have begun on Alaska's North Slope and are poised to expand into offshore areas. These developments could have, particularly in conjunction with marine transportation, a dramatic impact on the U. S. Coast Guard and especially its icebreaking mission. Evaluation of this impact is approached by a background review of the Coast Guard's icebreaking role and historical development in Alaska; and by evaluation of five issues which seem to be primary determinants of the relevant future. These include (1) energy development; (2) energy-related transportation; (3) concerns for the natural and social environment; (4) Canadian arctic developments; and (5) the international perspective. Trends in these five issue areas are then integrated to formulate a projection of future Coast Guard icebreaking requirements in the Alaskan arctic. (Author)

AD-A101 022/2 PC **A02**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Effect of Bow-Down Trim on the Resistance Characteristics of the AO 177 Hull Represented by Model 5326.
Final rept.,
William G. Day, Jr., and Douglas S. Jenkins. Jun 81, 15p Rept no. DTNSRDC/SPD-0544-16

Experiments were performed with a 1:25.682-scale model of the AO 177 to determine the effect of bow-down trim on the resistance of the hull. The three full-scale trim conditions represented were 1.5-foot (0.46 m) trim by the stern, 1.0-foot (0.3 m) trim by the bow, and 3.5-foot (1.07 m) trim by the bow. The results indicate a small increase in resistance at the 21.5-knot design speed with increasing trim by the bow. (Author)

AD-A101 111/3 PC **A05**/MF **A01**
Tetra Tech, Inc., Pasadena, CA.
Singular Perturbation Method for Supercavitating Propellers.
Technical rept. 11 Feb 80-10 Feb 81,
Okitsugu Furuya. 30 Jan 81, 82p Rept no. TETRAT-TC-3369-01
Contract N00014-80-C-0277

The singular perturbation method for the supercavitating propeller had four scaling parameters; (1) span length R, (2) chord length c, (3) blade spacing d and (4) cavity length 1 sub c. The first problem solved here assumed that c/R and 1 sub c/R were of order epsilon but d/R was of order of unity. The nature of the singular perturbation problem for such a case was similar to that for the subcavitating propeller solved by Brockett except for the solution of the inner region. The thrust and torque coefficients were obtained explicitly without solving the integral equations. Since the nonlinear supercavitating flow theory was employed in the present work as the inner solution, there existed no limitation for the flow incidence angles or blade profile shapes and thus the present solution would provide more accurate results than those with the linearized theory. The second problem treated here was the case in which c/R was of order of epsilon but 1 sub c/R and d/R were of order of unity. This was the case having long cavities behind the propeller blades so that even when the chord shrank to a line, the cavities were left behind the lifting lines. This portion of cavity sheets was called 'source sheets', the singularity strengths of which were obtained through the cavity sheet matching, a totally different matching procedure from the regular matching. The first-order inner solution used a closure condition, i.e., the total source term S(O) equal to zero.

AD-A101 131/1 PC **A15**/MF **A01**
Engineering Systems Co., Damascus, MD.
Drydock Extension - A 1980 Underwater Technology Survey for Extension of Time between Drydocking.
Final rept. Apr-Dec 80,
F. Matanzo, J. Metcalf, A. Nelson, and R. Renuart. Dec 80, 337p USCG-D-15-81
Contract DTCG23-80-C-20009

The results are presented of a feasibility study to extend the time between drydocking of commercial vessels under U.S. Coast Guard jurisdiction. The existing drydock inspection requirements are documented and then compared to underwater technology. It is demonstrated that with trained divers, underwater closed circuit television, and color photography, the Coast Guard inspector can be provided with the visual information he needs. Problems with water turbidity can be alleviated by careful selection of the sea port and matching the camera and light sources. Use of blanking flanges and listing and tipping of a vessel allow for a complete inspection. Underwater preservation, maintenance, and repair are all possible with existing underwater technology. (Author)

PB81-220972 PC **A06**/MF **A01**
Henry (J. J.) Co., Inc., New York.
Next Generation Cargo Liner. Volume I: Preliminary Design for a Standard Ship.
Final rept. on Phase 2.
May 81, 114p MA-RD-940-81073
Contract MA-6-38060
See also PB81-220980.

Phase I of the development of the Next Generation Cargo Liner addressed the commercial trade forecasts and the development of custom ship designs for seven participating owners. Phase II was to prepare a preliminary design of a standard ship which would satisfy a composite of the various owners' requirements. In attempting this it became clear that additional research and development is

needed. Volume I addresses three sizes of vessels ranging from 18,700 DWT to 26,030 DWT and service speeds from 20 to 23 knots. These vessels can accommodate RO/RO, containers, and break-bulk cargo depending on outfitting.

PB81-220980 PC **A09**/MF **A01**
Henry (J. J.) Co., Inc., New York.
Next Generation Cargo Liner. Volume II: Identification of the Research and Development Needs of a Next Generation Cargo Liner.
Final rept. on Phase 2.
May 81, 185p MA-RD-940-81074
Contract MA-6-38060
See also PB81-220972, and PB-297589.

Phase I of the development of the Next Generation Cargo Liner addressed the commercial trade forecasts and the development of custom ship designs for seven participating owners. Phase II was to prepare a preliminary design of a standard ship which would satisfy a composite of the various owners' requirements. In attempting this it became clear that additional research and development is needed. Volume II addresses the research and development requirements necessary to support a next generation cargo liner. Topics included Hull Form, Powering, Structure, Outfitting, Cargo Handling, Cargo Hold Access, Machinery, Electrical and Electronics, Operation, and Safety.

PB81-221848 PC **A07**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Structural Analysis of the Collapsing Bow of a Striking Ship.
Final rept.,
Pin Yu Chang, and Chirasak Thasanatorn. 28 May 80, 128p TR-8029-1, MA-RD-940-81065
Contract MA80-SAC-01051
Portions of this document are not fully legible.

A mathematical model and structural dynamic computer program have been developed for the analysis of the collapsing bow of a striking ship. The model can be used to predict the collision impact force and the extent of damage of the striking ship bow in both perpendicular and oblique collision. The ice breaker POLAR STAR was used as an example for testing the computer program for an oblique collision angle. The companion report has been released under the title 'Formulas and Procedures for Estimating Collapse Loads of Ship Structural Members,' Report No. MA-RD-940-81066.

PB81-221855 PC **A04**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Formulas and Procedures for Estimating the Collapse Loads of Ship Structural Members.
Final rept.,
Pin Yu Chang. 28 May 80, 66p TR-8029-2, MA-RD-940-81066
Contract MA80-SAC-01051

Formulas and procedures for the estimating collapse loads of ship structural members are presented. These formulas are essential for the determination of the velocity field for the analysis of the collapse loads of ship structures in collision. (Re Report No. MA-RD-940-81065, Title: Structural Analysis of the Collapsing Bow of a Striking Ship.) Most of these formulas are based on results published in the literature, with some modification by the author.

PB81-224099 PC **A02**
Hawaii Univ., Honolulu. Dept. of Mechanical Engineering.
Development of a New Concept for Cylindrical Pressure Hulls,
R. H. Knapp, R. T. Kudo, and B. Auksmann. Aug 80, 7p UNIHI-SG-JC-81-05, NOAA-81051107
Grant NOAA-04-6-158-44026
Pub. in Jnl. of Engineering for Industry, v102 n3 p253-257 Aug 80.

The prebuckled cylindrical (PC) shell represents a new structural concept suitable for use in the undersea environment. The externally pressurized PC shell has been shown to be more resistant to buckling failure than a comparable 'true' cylinder. The technical feasibility of this new concept has now been realized by the design and construction of a large-scale prototype made entirely of transparent acrylic plastic. The success of this initial effort offers encouragement to further pursue applications of this novel structural form to other uses in the ocean.

PB81-224438 PC **A13**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Geotechnical Reliability of Offshore Gravity Platforms,
Gregory B. Baecher, Mark Chan, Thomas S. Ingra, Thomas Lee, and Louis R. Nucci. Dec 80, 298p MITSG-80-20, NOAA-81042708
Grant NOAA-04-7-158-44079

The main part of the report is organized into five broad chapters. The first presents an overview of the sources of geotechnical uncertainty in offshore structures, previous quantitative analysis of those uncertainties, and the philosophy of formal methods in geotechnical reliability analysis. The second and third examine the basic uncertain variables, dealing with environmental loads and load effects, and with site characterization and parameter estimates, respectively. Chapter 5 is an extended discussion of the problem of modeling foundation performance, and the uncertainties of that undertaking. Finally, Chapter 6 considers the aggregation of these uncertainties into overall estimates of risk and reliability. To illustrate the analyses and methods developed in the course of the work, a specific site on the southern flank of Georges Bank has been chosen for discussion. Specific information on the site has been introduced as needed throughout the report.

PB81-871519 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ice Breakers and Ice Breaking. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 104p

Modern design of ice breaking vessels and equipment, for support of shipping and offshore structures, is considered. Hull design and propulsion systems are emphasized. Mechanisms of ice disintegration and ice breaking techniques are included. (Contains 120 citations fully indexed and including a title list.)

PB81-872269 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Gas: Bulk Carriers. January, 1974-July, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jul 81.
Jul 81, 75p

The construction and operation of ships for the transport of liquefied natural gas are considered. Emphasis is on safety devices as well as the equipment used for loading and unloading. Insulation requirements for tanks are included. (Contains 75 citations fully indexed and including a title list.)

PB81-872434 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Pipelines. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 65p

This bibliography covers the planning, design, fabrication, construction, and quality control for underwater pipelines, chiefly for oil and gas transmission. Also considered are underwater pipeline protection, inspection, and repairs. Some attention is given to pipe laying equipment and to specific pipelines. Coverage is worldwide. (Contains 59 citations fully indexed and including a title list.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

DE81023223 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Packed-Bed Letdown System.
P. K. Carlson. 1981, 11p CONF-810607-3
Contract W-7405-ENG-26
Symposium on instrumentation and control for fossil energy processes, San Francisco, CA, USA, 8 Jun 1981.
Microfiche only after original copies are exhausted.

One problem component in coal liquefaction plants is the high-pressure dissolver (or reactor) slurry letdown valve. Two types of failures in letdown valves are trim erosion and breakage or separation of trim. A packed-bed letdown system would reduce the pressure. Computer design studies of such packed bed were conducted. 5 figures. (ERA citation 06:022997)

DE81024008 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
In-Place Testing of Tandem HEPA Filter Stages Using Fluorescent Aerosols.
J. C. Elder, T. G. Kyle, M. I. Tillery, and H. J. Ettinger. Apr 81, 41p LA-8805-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

Fluorescent test aerosols have been incorporated into an in-place two-stage high-efficiency particulate air (HEPA) filter test method to improve sensitivity and eliminate interference by background aerosol leaking into the downstream sampling location. The method has been demonstrated by field testing large two-stage HEPA systems, one with a flow rate of 22 m exp 3 /s (48,500 cfm) and a decontamination factor (DF) of approximately 10 exp 8 . Advantages of the method, such as DF measurement more representative of actual filter performance and potential savings in construction and testing costs, make the fluorescent particle method a useful test method. A laser fluorescent particle spectrometer suitable for testing by this method was developed in conjunction with an instrument manufacturer and is commercially available. An improved dilution system was developed to reduce upstream aerosol concentration into the operating range of the spectrometer. Generation of a fluorescent dye-tagged DOP aerosol was accomplished by high-capacity, gas-thermal generator. Aerosol concentration of approximately 2 x 10 exp 6 particles per cm exp 3 was maintained in the plenum upstream of the first stage. Other in-place test methods using fluorescent particles collected on sampling filters were investigated with only limited success and could not be extended to two-stage testing. The potentially most sensitive method, counting of solid fluorescent particles on sample filters taken upstream and downstream of HEPA filter stages, was restricted by particle losses in the resuspension operation. Maximum DF measurable by a solid fluorescent particle method was predicted to be 3 x 10 exp 3 , which would be adequate for testing one high-quality HEPA filter stage without excessive filter loading. (ERA citation 06:024126)

DOE/CS/40183-T1 PC **A05**/MF **A01**
Aerospace Research Corp., Roanoke, VA.
Redesign of Turbine-Pump Impeller and Diffuser Using Hydrodynamic Design Techniques. Final Report.
J. T. Hamrick. Apr 80, 97p ORO-5127-1
Contract AC01-78CS40183

It is indicated that in 1976 the average operating efficiency of well irrigation pumps in the US, including losses in the column pipe and line shaft, was 55.5%, but information is presented to show that losses in a pumping system can be reduced and that it is possible to reach a goal of 82% system efficiency. Hydrodynamic design methods which are used to analyze and modify a commercially available pump are presented. The results of tests with the pump are presented for which delivery losses were reduced by means of a packer at the pump and for which line shaft losses were reduced by means of a high strength line shaft. Methods of designing pumps that have a broader high efficiency range are explored, and a design approach for doing so is presented. The method was not evaluated experimentally. (ERA citation 06:022239)

DOE/ET/10373-T6 PC **A02**/MF **A01**
Combustion Power Co., Inc., Menlo Park, CA.

Granular Bed Filter Development Program, Phase II. Quarterly Report, June-August 1980.
L. L. Moresco. May 81, 6p
Contract AC21-77ET10373

During this period the program was redirected to obtain data on an improved version of the screenless moving Granular Bed Filter (GBF) rather than construct the device with the improvements incorporated and test at the Curtiss-Wright facility. Work in the interim was directed toward low temperature testing of the improved GBF and obtaining physical data for a numerical model of the GBF. (ERA citation 06:021997)

DOE/MC-143 PC **A03**/MF **A01**
TRW Energy Engineering Div., Morgantown, WV.
Prototype Lockhopper Valve Testing and Development Project Test Plan.
J. F. Gardner, and T. R. Holtz. Apr 81, 50p
Contract AM21-80MC14522

This document has been prepared to summarize the overall plan for testing and evaluating prototype lockhopper valves being developed by Fairchild Industries, Inc., Stratos Division, and Consolidated Controls Corporation under contract to DOE/METC. The testing effort described herein will be used to establish the capability of these valves to meet the design criteria contained in Lockhopper Valve and System Design Criteria and Guidelines for Coal Conversion and Utilization Applications, DOE/METC/54-138. The design criteria were based on the requirements of the Lockhopper Valve RFP 1813, analysis of those coal conversion processes that are most promising for demonstration and pioneer commercial plants, and a desire for valve life comparable with other plant equipment. The test plan was prepared with inputs from, and in cooperation with, Morgantown Energy Technology Center personnel and is a major revision of Prototype Lockhopper Valve Test Plan, METC/R1-79/5/R2. (ERA citation 06:023025)

13L. Safety Engineering

PB81-204851 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Pipeline Accident Report - The Pipelines of Puerto Rico, Inc., Petroleum Products Pipeline Rupture and Fire, Bayamon, Puerto Rico, January 30, 1980.
19 Dec 80, 69p NTBS-PAR-80-6

At 9:50 a.m., on January 30, 1980, an 8-inch-diameter, refined petroleum products pipeline owned by the Pipelines of Puerto Rico, Inc., and operated by the Shell Oil Company (Puerto Rico) Ltd. was struck and ruptured by a bulldozer during maintenance work on a nearby waterline in the Sector Cana of Bayamon, Puerto Rico, about 10 miles southwest of San Juan. Gasoline from the rupture sprayed downhill and ran off into a small creek. About 1 1/2 hours later, the gasoline vapors were ignited by an undetermined source and exploded; the subsequent fire killed one person and extensively damaged 25 houses and other property. The National Tranportation Safety Board determins that the probable cause of the accident was the rupture of the pipeline by a bulldozer, whose operator was unaware of the pipeline's precise depth and location, and the failure of the Aqueduct and Sewer Authority and the Highway Authority personnel at the accident site to ascertain the exact location of the pipeline and to take proper precautions. Contributing factors in the accident were the lack of visible aboveground temporary markers to show the exact location where the pipeline crossed under the waterline, and the use of heavy construction equipment near the pipeline while the pipeline company inspector was absent.

PB81-207102 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Pipeline Accident Report - Union Light, Heat and Power Company, Natural Gas Explosion and Fire, Simon Kenton High School, Independence, Kentucky, October 9, 1980.
28 Apr 81, 40p NTSB-PAR-81-1

About 11:55 a.m., on October 9, 1980, a 2-inch-diameter compression coupling located on the upstream side of a gas meter set assembly in the boilerroom of the Simon Kenton High School in Independence, Kentucky, pulled out of its connection with a 2-inch-diameter gas service line. Natural gas at 165-psig pressure escaped through the 2-inch-diameter opening and, seconds later, exploded and burned. A basement wall was blown down, an adjacent classroom was damaged, and one student was killed. About 30 minutes later, a second explosion occurred which injured 37 persons and extensively damaged the school. The gas service line was connected to a 4-inch-diameter gas main owned by the Union Light, Heat and Power Company, which was uprating the gas main by controlled pressure increases at the time of the accident.

PB81-211823 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC.
Motor Vehicle Collisions with Trees Along Highways, Roads, and Streets: An Assessment.
Special study.
13 May 81, 74p NTSB-HSS-81-1

The National Transportation Safety Board has studied extensive data collected regarding vehicle collisions with trees, has investigated 19 accidents involving trees, and as a result has determined certain characteristics of such collisions. In addition, the Safety Board reviewed information supplied by seven States regarding accident data, roadside obstacle programs, and tree removal or protection programs. About 3,280 fatalities resulting from vehicle collisions with trees occur annually in the United States. NCSS data showed that vehicle accidents with trees are more severe than other frontal collisions and that when passengers fail to use restraints, fatalities may occur at speeds as low as 16 to 20 mph. The Safety Board found that few projects exist to remove or protect roadside trees, and that minimal delineation or warning signs existed at some of the accident locations. To reduce the number and severity of vehicle collisions with trees, the Safety Board has recommended implementing programs to warn motorists of the changes in roadway alignment and to protect or selectively remove roadside trees.

PB81-215345 PC **A08**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
Vehicular Impact Tests of a Truck Mounted Attenuator Containing Vermiculite Concrete Cells.
Final rept.,
R. L. Stoughton, J. R. Stoker, and E. F. Nordlin. Jun 80, 156p 609936, FHWA/CA/TL-80/26

Six vehicular impact tests were conducted. Cars ranging in weight from 1890 lbs to 4480 lbs impacted the rear end of dump trucks at speeds of 45 mph. In five of the tests truck mounted attenuators (TMA's) were used on the trucks. The TMA tested was a 6 ft-0 in. long by 8 ft-0 in. wide by 2 ft-0 in. high plywood box enclosing 84 crushable vermiculite concrete cells arranged in a designed pattern. The tests were intended to study (1) the effectiveness of the TMA in reducing car and truck damage and decelerations, (2) the vehicle trajectories after impact and specifically the roll ahead distance of the trucks using different truck braking conditions, and (3) other characteristics of the TMA's such as ease of use, amount of debris after impacts, durability, etc.

PB81-216244 PC **A03**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
Pedal Cycle Conspicuity.
Technical rept.,
W. H. J. Sator. Oct 79, 41p RV/1/79

Local and overseas research has shown that a lack of rear conspicuity in pedal cycles plays a major role in serious accidents involving these vehicles. The results of a survey showed that almost all pedal cycles on South Africa roads were not conspicuous at a 'safe distance' from the rear at night. This was mostly due to inadequate rear retro-reflectors. A large proportion of these retro-reflectors are imported and do not comply with the Road Traffic regulations. Experiments were conducted to establish the reflective value of an effective retro-reflector. Recommendations are made for increasing pedal cycle conspicuity.

PB81-216251 PC **A02**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
Pedestrian Fatalities: A Comparison of Experience in the United States of America and in South Africa during the Year 1976-1978.
Technical rept.,
J. O'Day, and H. B. Pretorius. Sep 79, 16p RY/9/79

The co-author of this report, H. B. Pretorius of this Institute, visited the Highway Safety Research Institute of the University of Michigan (HSRI) in the USA for the period 1 July 1979 to 4 September 1979. In collaboration with Mr. J. O'Day, Head of System Analysis (HSRI) he compared the pedestrian fatalities of the USA and SA with respect to age groups VS hour of the day. It is observed that in both countries one particular problem area is accidents involving 5 and 6 year old children after school. The reason for the differences between the other groups is not clear but differences in the environment and weather may be a major factor.

PB81-216608 PC **A07**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Bicyclists' Inclination and Ability to Search Behind Before Turning Left.
Interim rept. Nov 79-Jul 80,
S. M. Casey, K. D. Cross, W. A. Leaf, and R. D. Blomberg. Feb 80, 127p DOT-HS-805-893
Contract DOT-HS-7-01726
Also pub. as Anacapa Sciences, Inc., Santa Barbara, CA. Rept. no. AS-TR-373-1.

Research has identified a relatively high incidence (8.4%) bicycle/motor-vehicle accident type in which a bicyclist initiates a left-hand turn without searching to the rear or signaling and is struck by an overtaking motor vehicle. In order to consider countermeasures to this accident type, it was necessary to understand the frequency with which bicyclists actually search behind before turning left, and to determine the ability of bicyclists to maintain lateral stability when looking behind. Hence, two separate studies were conducted. The first, a field-observation study, was performed to assess the frequency with which bicyclists search behind before initiating a left-hand turn. The second experiment measured the magnitude of the inadvertent lateral deviations that accompany a rearward search as a function of the bicyclist's age and riding experience.

PB81-217739 PC **A02**/MF **A01**
BioTechnology, Inc., Falls Church, VA.
Safety Aspects of Using Vehicle Hazard Warning Lights, Volume 1.
Final rept. Dec 77-May 80,
Richard L. Knoblauch, and Henry N. Tobey. Sep 80, 24p FHWA/RD-80-101
Contract DOT-FH-11-9385
See also PB81-217747, Volume 2.

The report describes a series of experiments that were conducted to examine the effectiveness of four-way flashers. Both the disabled vehicle situation and the slow-moving vehicle situation were examined at two- and four-lane locations under both daylight and nighttime conditions. The disabled vehicle tests involved parking a test vehicle (either a car or a tractor-trailer) at the side of the road and monitoring the behavior of drivers. The slow-moving vehicle tests involved introducing a staged slow-moving vehicle (either a car or a tractor-trailer) into the traffic stream and observing the overtaking vehicles. At the disabled vehicle, red and amber four-way flashers as well as flares, reflectorized triangles, headlights, and other situational factors were evaluated. For the slow-moving vehicle tests, the effects of red and amber flashers as well as a 30 and 40 mph (48.3 and 64.4 kph) slow-moving vehicle were examined.

PB81-217747 PC **A08**/MF **A01**
BioTechnology, Inc., Falls Church, VA.

Safety Aspects of Using Vehicle Hazard Warning Lights, Volume 2.
Final rept. Dec 77-May 80,
Richard L. Knoblauch, and Henry N. Tobey. Sep 80, 165p FHWA/RD-80-102
Contract DOT-FH-11-9385
See also Volume 1, PB81-217739.

The purpose of this study was to obtain sound, objective data on the nature of drivers' responses to flashers. The basic problem was to determine what effect flashers have on the traffic stream approaching a slow-moving or a disabled vehicle.

PB81-219297 PC **A08**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Development of Test of Selected Model Pedestrian Safety Regulations.
Final rept. Aug 76-Apr 81,
W. A. Leaf, and R. D. Blomberg. Apr 81, 170p ED-81-2, DOT-HS-805-901
Contract DOT-HS-6-01444

Two model regulations to remove parking--one from suburban streets in daylight hours and one on the last 50 feet of the approach to crosswalks--were designed in previous work to prevent pedestrian dart and dash accidents by removing screening vehicles, therby allowing pedestrians and motorists to more easily see each other and react as needed. To evaluate the safety benefits of the regulations, a study was conducted in New York City. The residential areas of Manhattan have one-side-only parking for three hours per day according to a scheme balanced by time of day and affected side of street. Accident data from 1974-1977 were screened and reports were reviewed. Based on 835 pedestrian accidents, no changes in accident distributions were found when the alternateside parking regulation was in effect. Supplementary observations in the test areas showed good but imperfect compliance with the parking bans and virtually no changes in pedestrian frequency of appearance and gross behaviors as a function of parking changes. The pattern of results plus discrepancies between the New York study situation and the model regulations meant that little could be concluded with respect to the effectiveness or noneffectiveness of the regulations. Guidelines for further research were presented, stressing the need for direct comparability to the model regulations.

PB81-220725 PC **A07**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Workshop to Review Problem-Behavior Research Programs: Alcohol, Drugs, and Highway Safety.
Final rept. 1978-81,
M. E. Marks, A. C. Donelson, J. R. Treat, R. K. Jones, and K. B. Joscelyn. May 81, 130p UM-HSRI-81-21, DOT-HS-805-908
Contract DOT-HS-8-02031

The report presents the proceedings of a workshop on alcohol, drugs, and highway safety. The purpose of this workshop was to develop specific recommendations for the planning and implementation of NHTSA research, development, and demonstration projects in the program area of Alcohol and Drugs. Workshop participants represented both the practitioner and researcher communities. General issues related to the program area of alcohol and other drugs were discussed, and specific program elements reviewed in-depth. Two working groups participated in a series which dealt with the following topics: General Objectives of the Alcohol and Drugs Problem Identification; Countermeasure Development, Test, and Evaluation; Knowledge Transfer; Demonstration and Other Techniques; and Other Drugs and Other Topics. This report summarizes discussions of these topics. Conclusions about the general objectives of an alcohol and drugs program and recommendations concerning specific program elements concerning the direction of future research in this area are presented.

PB81-221400 PC **A03**/MF **A01**
Opportunity Systems, Inc., Washington, DC.
The Effectiveness of Head Restraints: An Analysis of Texas Data.
Final rept. Oct 80-May 81,
Clayton Best, Donald Whittier, and Jim VanMeter. May 81, 43p DOT-HS-805-907
Contract DTNH-22-80-C-06017

The primary objective of the report was to determine the injury reducing effectiveness of head restraints in rear impact collisions. Three categories of injuries were analyzed from records on the 1972 Texas accident data set. Multi-dimensional contingency table analysis was used to control for the confounding effects of four variables (vehicle damage severity, driver age, driver sex, and vehicle size). In addition, side impact collisions served as a control group to remove any biases in the raw data. The study found significant effectiveness rates in all three categories of injuries after controlling for the presence of confounding effects.

PB81-910406 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report--Kellogg Company Avions Marcel Dassault Breguet Falcon 10, N253K, Meigs Field, Chicago, Illinois, January 30, 1980.
12 May 81, 25p NTSB-AAR-81-6
Papercopy available on subscription, North American Continant price $50.00; all others write for quote. Issued irregularly.

At 1548:35 c.s.t., on January 30, 1980, a Kellogg Company Falcon 10, N253K, crashed into Lake Michigan just after an attempted takeoff from runway 18 at Meigs Field, Chicago, Illinois. The aircraft came to rest in 25 feet of water about 300 feet from the departure end of the runway. Of the four passengers and two crewmembers aboard, one passenger and one crewmember were killed. The other four persons were injured seriously. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's failure to release the parking brake before the takeoff roll was started, which resulted in significant wheel/brake drag and a nosedown pitching moment that inhibited the aircraft's capability to effect a normal acceleration and rotation for takeoff. Contributing to the accident was the lack of adequate company checklist procedures to insure the timely release of the parking brakes.

13M. Structural Engineering

AD-A101 021/4 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Investigation of Deterioration of Brick in Navigation Lock Control House Structures, Tulsa District.
Final rept.,
Robert H. Denson, G. Sam Wong, and Tony B. Husbands. Sep 80, 58p Rept no. WES/MP/SL-80-14

The deterioration of brick in certain control house structures at five navigation locks was characterized by partial or complete separation of laminations from the face of several bricks. Some of the laminations had fallen completely off. Deteriorated and nondeteriorated samples were removed from several structures and were evaluated by physical testing and petrographic examination. The deterioration mechanism was identified as moisture intrusion accompanied by freezing and thawing. Six model walls were constructed and each was coated with a different protective coating to determine the effectiveness of such treatment. The six coatings were rated in order of efficiency in producing protection with urethane coatings outperforming epoxy and silicone coatings. (Author)

HRP-0031403/9 PC **A15**/MF **A01**
Mathers and Haldenby, Toronto (Ontario).
Interstitial Space in Health Facilities: An Investigation and Report on the Application of the Interstitial Space Concept to Health Care Facilities.
Research study rept.
Jan 79, 329p

Interstitial space is defined, for purposes of this study, as a fully accessible walk-through space at least two metres (6'-6") in height beneath a framed floor structure and above the ceiling below, devoted to the distribution of mechanical and electrical services, reducig the need for access from (and consequent disruption to) the uninvolved occupied rooms below for purposes of alterations and repairs. The purpose of the study is to indicate a methodology for prospective building owners and designers to assist in determining whether or not to incorporate interstitial spaces in the design of a specific building.

LBL-9749 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Residential Ventilation with Heat Recovery: Improving Indoor Air Quality and Saving Energy.
G. D. Roseme, J. V. Berk, M. L. Boegel, H. I. Halsey, and C. D. Hollowell. May 80, 30p CONF-791233-4, EEB-Vent-80-10
Contract W-7405-ENG-48
Conference on thermal performance of the exterior envelopes of buildings, Orlando, FL, USA, 3 Dec 1979.

Interest in conserving energy is motivating homeowners and builders to reduce natural infiltration to very low levels. This large reduction in ventilation can lead to indoor moisture problems and, more importantly in terms of human health, increased levels of indoor pollutants such as nitrogen dioxide, formaldehyde, and radon. This paper reports residential air-quality measurements conducted by LBL and, specifically, discusses the use of mechanical ventilation systems with air-to-air heat exchangers as a promising means of pollutant control. A particular advantage of this control strategy is that the heat exchanger permits recovery of a large portion of the heat that would normally be lost in a simple exhaust ventilation system, and therefore maintains the energy efficiency of the house. An economic analysis is presented showing that installation of these systems in newly constructed homes is cost-effective in most regions of the country. (ERA citation 05:032440)

PB81-214504 PC **A03**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Requirements for Statistical Data on Fires in Buildings.
c1977, 38p CIB/PUB-42

Although fire reports are made and collected by various organizations other than building authorities, primarily by the public fire brigades, building research workers make use of these data and have considerable interest in expressing what they need from them. This report, largely written by the first co-ordinator of W14 from personal experience in the processing of United Kingdom fire statistics draws attention to some of the problems and offers guidance on practical solutions in this field of data selection and acquisition.

PB81-214512 PC **A11**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Fire Safety in Buildings: Needs and Criteria (La Securite des Batiments Contre L'Incendie: Besoins et Criteres).
Final rept.
1977, 235p CIB/PUB-48
Text in French and English.

This symposium took place under the auspices of the Conseil International du Batiment (CIB), a nongovernmental organization, which promotes international collaboration in research into buildings and their environment. Those taking part in this collective effort included public and private research bodies, professional association, industries and enterprises, and working commissions of specialists from different national institutes undertake international research and study projects. One such is the Fire Commission (CIB-W14) which is working on problems related to fire safety in buildings. Through this symposium, W14 can foster international discussion of the fire problems to which many separate organizations and countries are paying increasing attention. Very roughly, the technical fire problem is how to design or specify a product or fire protection system to meet certain safety requirements of consumers, insurers, manu-

facturers or governments ets. For these purposes research concentrates on the behaviour of fire and the behaviour in a fire of materials, products, components etc.

PB81-214603 PC **A04**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Principles of Fire Safety in Buildings.
c1978, 59p CIB/PUB-41

The problem of providing safety from fire in buildings is attracting more and more attention nationally and internationally as new materials and designs pose new problems to the engineer and designer and to the authorities responsible for safety. This guidance note, while not referring to all matters which might affect life and property loss in fire, has been prepared by CIB Working Commission W14, Fire, for people who are not specialists in fire matters but who may be confronted with a particular problem of design or equipment, and who wish to see it in a wider context. A bibliography is provided for further reading of special or more detailed aspects of some of these topics.

PB81-214694 PC **A07**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Compendium of Working Commissions and Steering Groups.
22 Jan 81, 139p

The latest edition of the Compendium of CIB Working Commissions and Steering Groups has been compiled on the basis of information available to the General Secretariat as per January 1981. It updates the previous edition issued in 1974. While every effort has naturally been made to ensure the accuracy of the information contained, for certain practical reasons the lists of members accompanying each entry may not always be the most up to date. The data given in this Compendium clearly demonstrate that it is within the Working Commissions and Steering Groups that the main thrust of CIB's activities lies and reference to the list of contents will show the varied directions which these activities take. Working Commissions are established in those fields in which a present or future need is identified for common scientific study of potential benefit. Steering Groups, on the other hand, are set up on practical criteria to execute specific tasks as for example, the organization of a Symposium where the principal aim is the exchange and transmission of knowledge.

PB81-217226 PC **A11**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
Research on Maintenance and Modernization, Working Commission W70: Proceedings of the Rotterdam Seminar, 25-27 September 1979.
c1980, 231p CIB/PUB-54

These Proceedings are the result of a researchers' seminar organized by Working Commission W70-Maintenance and Modernization, held in Rotterdam from 25 to 27 September 1979. The seminar's main objective was to widen information exchange between researchers in different countries and see what measures C1B/W70 should take to enable research to be effectively used for solving maintenance and modernization problems. At the seminar a series of lectures on maintenance and modernization research was presented, together with a presentation of the results of the questionnaire. The seminar was closed with a discussion about future work within W70. A paper written by the coordinator provided the foundation for discussion. The papers are included in these proceedings, together with a summary of the related discussion. As far as a presentation at the seminar varied from the corresponding paper, an outline of that presentation is given too. Besides that, some of the authors have written a revised version of their paper for this publication, incorporating parts of their presentation at the seminar.

PB81-217242 PC **A06**/MF **A01**
Conseil International du Batiment pour la Recherche l'Etude et la Documentation, Rotterdam (Netherlands).
International Recommendations for Masonry Structures.
1980, 102p CIB/PUB-58

The present recommendations are part of a set of 6 volumes forming an International System of Technical Recommendations for the Design and Execution of structures. The aim of this set of volumes is to give a common basis for the designer and the builder of structures and to allow different countries to draw on them in drafting national standards. The present volume is based on volume I as far as the general principles for the safety and the control of structures, independent of the basic materials (concrete, steel masonry or timber) are concerned. Anything mentioned in the present volume is specifically applicable to masonry. These recommendations are specially intended for the use of code-drafters but where desired may be used by individuals.

PB81-219172 PC **A16**/MF **A01**
Lehigh Univ., Bethlehem, PA. Fritz Engineering Lab.
Seismic Resistance Characteristics of Reinforced Concrete Beam-Supported Floor Slabs in Building Structures: Contribution of Floor Systems to Earthquake Resistance of Building Structural Frames,
Masayoshi Nakashima, Ti Huang, and Le-Wu Lu. Apr 81, 353p FEL-422.9

This study investigates the in-plane seismic characteristics of reinforced concrete floor slabs which function as diaphragms placed between lateral load resisting systems. The paper focuses on the floor slab system with edge beams, referred to as the beam-supported floor system. The investigation consists of four phases: (1) experimental study, (2) analytical study, (3) parametric study, and (4) dynamic response analysis.

PB81-219735 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Stochastic Models for Dependent Load Processes.
Civil engineering studies,
Y. K. Wen, and H. T. Pearce. Mar 81, 81p
Structural research ser-489, UILU-ENG-81-2002
Grant NSF-CME79-18053

Stochastic models for dependent loads and load effects are developed. The effects of stochastic dependencies on load combination and structural reliability are investigated in the context of summation of pulse processes in which occurrence time, intensity and duration are allowed to be correlated within each process and between processes. Approximate analytical solutions based on a load coincidence method are obtained and verified by Monte-Carlo simulations. It is found that while within load positive correlations may generally have only moderate effect on the combined load probability, between-load dependencies may be dominant factors and significantly increase the probability of threshold level being exceeded by the combined load.

PB81-220790 PC **A06**/MF **A01**
California Polytechnic State Univ., San Luis Obispo. Dept. of Architectural Engineering.
Racking Tests of Non-Structural Building Partitions (The Behavior of Architectural (Non-Structural) Building Components During Earthquakes).
Final technical rept.,
Satwant S. Rihal. Dec 80, 114p ARCE-R80-1, NSF/RA-800526
Grant NSF-PFR78-23085

The effects of inter-story displacement (drift) during earthquake-like conditions are reported. A series of experiments were conducted (1) to study the correlation between inter-story relative displacement and building partition behavior under horizontal racking loads; (2) to assess the threshold levels of partition damage during horizontal racking actions; and (3) to determine the fundamental characteristics of non-structural building partitions (stiffness and energy absorption capacity and strength) under horizontal racking actions simulating earthquake motion. Parameters in this study consist of geometry of partition configuration and placement of gypsum wallboard panels. Development of the testing program is described and test results, sources of error, and future research plans are presented. Included in the appendices are drawings of test frame and partition test specimens, results of racking tests, and photographs.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A100 644/4 PC **A03**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
EMP Vulnerability Assessment of the AN/USM-410, a Computerized, Van-Mounted Electronic Equipment Test System.
Technical memo.,
Thomas A. Rose. Apr 81, 47p Rept no. HDL-TM-80-29

An analytical study was performed to assess the survivability of the AN/USM-410, van-mounted configuration, to the nuclear electromagnetic pulse. The AN/USM-410 is an automated test system for repairing electronic equipment. The system uses commercial, off-the-shelf automatic data-processing equipment to control specially designed test and interface equipment. This report describes the philosophy and technique for the assessment and presents conclusions and recommendations for reducing the system susceptibility level. (Author)

AD-A100 762/4 PC **A12**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Automated DC Parameter Testing of GaAs MESFETs Using the Singer Automatic Integrated Circuit Test System.
Master's thesis,
Thomas L. Harper. Sep 80, 253p Rept no. AFIT/EE/GE/80-7

Procedures were developed to automate the manual testing of the DC parameters of GaAs MESFETs, integrated resistors and Schottky diodes. These devices are elements of a NAND/NOR logic circuit developed by Hewlett-Packard. The Singer Automatic Integrated Circuit Test System located at the Air Force Wright Aeronautical Laboratories, Avionics Laboratory (AFWAL/AADE), Wright-Patterson AFB, OH, was used to develop these procedures. The system was built by Singer Aerospace and Marine Systems, Glendale, California to test the DC parameters of semiconductor devices using Singer's Elucidate programming test language. The following DC parameters for the above devices were to be tested using the Singer tester: drain-to-source voltage (V sub DS), saturated drain current (I sub DSS) with gate-to-source voltage (V sub GS) at 0.0 volts, linear on-resistance and saturation resistance at V sub GS = 0.0 volts, pinch-off voltage (V sub P), transconductance (g sub M), breakdown voltage (BV)L at V sub GS = 0.0 volts, diode forward and reverse threshold voltages, and resistance. Test results have been obtained for the following MESFET parameters: V sub DS, I sub DSS, V sub GS, linear on-resistance and saturation resistance, V sub P and g sub M. Unfortunately, due to system measurement inaccuracies, these results do not compare favorably when compared iwth curve tracer I-V curves of the MESFETS.

AD-A100 792/1 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Programmed Control of Optical Grating Scales for Visual Research.
Master's thesis,
Kenneth L. Martindale. Dec 80, 61p Rept no. AFIT/GE/EE/80D-29

This report documents the design of a microprocessor based device which controls the brightness and contrast levels of video signals to be used by scientists in vision research to control laboratory monitors. Contrast control in a standard CRT monitor is obtained through the use of a commercial video chip linear circuit, and brightness control via a straight forward transistor amplifier. The transistor is inserted into the monitor's existing manual control circuit. The linear circuit and transistor are regulated by the microprocessor through digital-to-analog converters. A feedback network reports the actual brightness and contrast produced on the monitor's screen. This network is comprised of a 1024 element photodiode array and an analog-to-digital converter. The photodiode array measures the luminance directly off the monitor and the analog-to-digital converter digitizes the information for use by the microprocessor. The report also contains the results of an investigation into the use of digitally generated video and color monitors for vision research.

AD-A101 112/1 PC **A02**/MF **A01**
National Bureau of Standards, Boulder, CO.
Cooled Ion Frequency Standard (FY81).
Summary rept.,
D. J. Wineland, and F. L. Walls. 1981, 7p
Contract N00014-81-F-0003

The purpose of this work is to develop techniques to overcome the fundamental limits of present frequency standards--the second and residual first-order Doppler shifts. To this end, we study suitable frequency reference transitions in ions which are stored in electromagnetic traps and cooled by radiation pressure to < 1K. (Author)

AD-A101 133/7 PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
A New Instrument for Time-Resolved Reduction of Scattered Radiation in Fluorescence Measurements.
Interim technical rept.,
R. E. Russo, and G. M. Hieftje. 1 Jul 81, 20p Rept nos. TR-39, 47
Contract N00014-76-C-0838

An opto-electronic cross-correlation system was employed to reduce the scattering influence in fluorescence measurements. A stable optical delay line incorporated into the instrument was positioned to yield detection at a fixed time after excitation; the optimal delay time was determined simply from the ratio of the fluorescence decay curve to a similar curve portraying scattering response. Signal-to-scattering background enhancements greater than two were measured for the very short-lived (TAU-0.07 ns) fluorophores whereas a six-fold increase was measured for longer lifetime fluorophores. The shortest lifetime which would benefit from time-resolution in this system is limited by the time-response of the PMT (1.1 ns FWHM); the excitation pulses are on the order of 6 ps. (Author)

AD-A101 169/1 PC **A07**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Ultrasonic Transducer Performance Requirements.
Final engineering rept. Oct 78-Jun 81 on Phase 2,
Hegeon Kwun, Garry L. Burkhardt, and Cecil M. Teller. Jun 81, 130p
Contract F41609-78-C-1823

Characteristic ultrasonic transducer parameters were measured for over one hundred sixty contact type ultrasonic transducers (of equivalent sizes) used by depot and field NDI shops in the Air Force. For each transducer, a maximum of twenty-four parameters was obtained which included electrical impedance, rf-echo and frequency spectrum, beam characteristics, sensitivity, and signal-to-noise ratio parameters. Transducers were categorized into six groups according to their nominal frequency and beam angle (i.e. 5 MHz and 10 MHz; 0 deg, 45 deg, and 60 deg). Except for 10 MHz-60 deg transducers, thirty-two transducers were evaluated for each category. For measurement of the beam characteristic parameters of the contact transducers, a side-drilled hole block and an automated data acquisition system were developed. Three small fatigue cracks of different sizes were used for the measurement of flaw signal-to-noise ratios (which determine the flaw detectability of a transducer). Wide variations were observed in the characteristic parameters for individual ultrasonic transducers having the same name-plate size, frequency and angle. However, the average performance for all transducers evaluated in each category of transducers was found consistent with theory. In order to find the characteristic parameters which primarily determine the flaw detectability of a transducer, a linear correlation analysis between pairs of parameters was conducted for each transducer category.

N81-26155/4 PC **A02**/MF **A01**
Dayton Univ., OH.
Evaluation of Moire Techniques for Wind Tunnel Metrology.
Interim Report, 4 Jan. - 30 Jun. 1981.
J. S. Harris, and K. G. Harding. Jun 81, 17p
NASA-CR-164477
Contract NAG1-143

The development of a moire technique suitable for the analysis of object deflections in a cryogenically cooled, transonic wind tunnel is described. The operating environment for the wind tunnel has a temperature range of 77 to 3390 k, pressure to 91390 Kgs/sq m, and noise to 150 dB SPL. Efforts were made to accomplish the following: to demonstrate projection moire as it would be used to study structural deflections; to use optical processing to multiply the sensitivity of the moire; and to investigate a system design based on the requirements of the wind tunnel geometry.

N81-26158/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Measurements of Temperature and Pressure Fluctuations in the T Prime 2 Cryogenic Wind Tunnel.
A. Blanchard, J. B. Dor, and J. F. Breil. Oct 80, 48p NASA-TM-75408
Contract NASW-3199
Transl. Into English of "Mesures des Fluctuations de Temperature et de Pression dans la Soufflerie Cryogenique T Prime 2" (Toulouse), OA8/5007 and Derat No. 8,5007 Dn, Jan. 1980 22 p. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Centre d'Etudes et de Recherches de Toulouse, France.

Cold wire measurement of temperature fluctuations were made in a DERAT T'2 induction powered cryogenic wind tunnel for 2 types of liquid nitrogen injectors. Thermal turbulence measured in the tranquilization chamber depends to a great extent on the injector used; for fine spray of nitrogen drops, this level of turbulence seemed completely acceptable. Fluctuations in static pressure taken from the walls of the vein by Kulite sensors showed that there was no increase in aerodynamic noise during cryogenic gusts.

N81-26183/6 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
Development of Orthotropic Birefringent Materials for Photoelastic Stress Analysis.
Final Report, Sep. 1978 - Nov. 1980.
I. M. Daniel, T. Niiro, and G. M. Koller. May 81, 79p NASA-CR-165709, IITRI-M06044
Contract NAS1-15541

Materials were selected and fabrication procedures developed for orthotropic birefringent materials. An epoxy resin (Maraset 658/558 system) was selected as the matrix material. Fibers obtained from style 3733 glass cloth and type 1062 glass roving were used as reinforcement. Two different fabrication procedures were used. In the first one, layers of unidirectional fibers removed from the glass cloth were stacked, impregnated with resin, bagged and cured in the autoclave at an elevated temperature. In the second procedure, the glass roving was drywound over metal frames, impregnated with resin and cured at room temperature under pressure and vacuum in an autoclave. Unidirectional, angle-ply and quasi-isotropic laminates of two thicknesses and with embedded flaws were fabricated. The matrix and the unidirectional glass/epoxy material were fully characterized. The density, fiber volume ratio, mechanical, and optical properties were determined. The fiber volume ratio was over 0.50. Birefringent properties were in good agreement with predictions based on a stress proportioning concept and also, with one exception, with properties predicted by a finite element analysis.

N81-26997/9 PC **A06**/MF **A01**
Dynatrend, Inc., Burlington, MA.
Report of the Facility Definition Team Spacelab Uv-Optical Telescope Facility.
Dec 75, 109p NASA-CR-166665
Contract NAS5-20936
Original Contains Color Illustrations.

Scientific requirements for the Spacelab Ultraviolet-Optical Telescope (SUOT) facility are presented. Specific programs involving high angular resolution imagery over wide fields, far ultraviolet spectroscopy, precisely calibrated spectrophotometry and spectropolarimetry over a wide wavelength range, and planetary studies, including high resolution synoptic imagery, are recommended. Specifications for the mounting configuration, instruments for the mounting configuration, instrument mounting system, optical parameters, and the pointing and stabilization system are presented. Concepts for the focal plane instruments are defined. The functional requirements of the direct imaging camera, far ultraviolet spectrograph, and the precisely calibrated spectrophotometer are detailed, and the planetary camera concept is outlined. Operational concepts described in detail are: the makeup and functions of shuttle payload crew, extravehicular activity requirements, telescope control and data management, payload operations control room, orbital constraints, and orbital interfaces (stabilization, maneuvering requirements and attitude control, contamination, utilities, and payload weight considerations).

PAT-APPL-6-098 429 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Test Sample Support Assembly.
Patent Application,
Ernest G. Wolff. Filed 29 Nov 79, 26p AD-D008 534/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention describes a test sample support assembly having its greatest utility in a length measuring device in a temperature controlled environment. The sample support assembly has a main support, a pair of insulating members and a sample support. In one embodiment of this invention the sample support is made of a substantially distortion-free material thereby precisely positioning the sample within the temperature controlled environment. In the other embodiment of this invention the sample support acts as the temperature controlling element. The sample support is adjustably mounted with respect to the main support. This adjustable feature permits corrective movement of the sample support to take place in order to compensate for the undesirable movement of the sample support. (Author)

PAT-APPL-6-177 978 PC **A03**/MF **A01**
Department of the Interior, Washington, DC.
Electrochemical Apparatus for Simultaneously Monitoring Two Gases.
Patent Application,
Stanley Bruckenstein, and John A. Rosek. Filed 14 Aug 80, 43p PB81-222614
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to monitors for quantitatively indicating the presence of gases and more specifically to a novel electrochemical gas monitor for simultaneously determining the concentrations of two different gases in a sample of ambient air.

PAT-APPL-6-219 704 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Calibrateable Light Ray Scattering Reference Rod.
Patent Application,
Jerry J. Klug. Filed 24 Dec 80, 8p PB81-222655, DOCKET/MIN-2947
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A calibrateable light ray scattering reference rod utilized in a light scattering dust monitor. This light ray rod scatters an amount of light equivalent to a given concentration of dust. Adjustability is provided so that several concentrations of dust can be represented. This adjustment is accomplished by moving a threaded opaque slug axially inside the translucent rod.

PAT-APPL-6-237 021 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Halogen Mass Flow Rate Detection System.
Patent Application,
Steven J. Davis. Filed 23 Feb 81, 25p AD-D008 527/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention concerns a halogen mass flow rate detection system having an absorption cell through which a halogen entrained inert gas can be passed. An electromagnetic beam of preselected wavelength in the bound-continuum absorption region is passed through the cell while the halogen entrained inert gas is also therein as well as while only an inert gas passes through the cell. By measuring the intensity of the beam passing through the absorption cell, molecular absorption can be utilized for determining the concentration and, therefore, the mass flow rate of the halogen passing through the absorption cell. By incorporating the halogen mass flow rate detection system in an iodine/oxygen chemical laser, for example, the mass flow rate of the iodine into the resonant cavity of the laser can be simply, accurately and reliably ascertained. (Author)

PAT-APPL-6-242 816 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
An Improved System for Measuring Angular Deviation in a Transparency.
Patent Application,
Harry L. Lask. Filed 11 Mar 81, 17p AD-D008 531/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved system for measuring absolute angular deviation through transparencies, such as aircraft windscreens, uses an incoherent light source and a target configuration in the form of an apaque slide with a transparent 'L'-shape pattern. The positions of images of the legs of the 'L' passed through the transparency are detected by CCD arrays for measurement of the azimuth and elevation components of angular deviation for each tested point on the transparency, uncontaiminated by lateral displacement errors. (Author)

PAT-APPL-6-256 868 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Low Power Driver for Flux Gate Magnetometer.
Patent Application,
Robert E. Brown. Filed 24 Apr 81, 14p AD-D008 551/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A driver circuit for a fluxgate magnetometer has a repetition rate controllable independent of the magnetometer core winding inductances, and a current-ON interval terminated only by core saturation. In this manner, power consumption is greatly reduced as compared to prior magnetometers without sacrificing low-noise operation. Previous drivers operated in a free-running flyback mode at high pulse repetition rates. The present driver reduced the oscillator repetition rate, and power consumption, by the use of a control loop from the flyback oscillator which signals the end of a current pulse as the magnetometer core rebounds from the saturated state. (Author)

PATENT-4 235 677 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Distillation Flask and Apparatus for Producing High-Purity Water Having Overflow Liquid Trap Means.
Patent,
Narbik A. Karamian. Filed 23 Feb 78, patented 25 Nov 80, 15p PB81-210882, PAT-APPL-880 425
Supersedes PB-283 607.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention discusses an apparatus for the continuous production of high-purity water which includes a distillation flask, a carboy and a condenser unit, all of borosilicate glass.

PB81-213373 PC **A03**/MF **A01**
Leeds and Northrup Co., North Wales, PA.
Modification of Optical Instruments for In-Stack Monitoring of Particle Size.
Final rept. Sep 79-Aug 80,
A. L. Wertheimer. Jun 81, 46p EPA-600/2-81-096
Contract EPA-68-02-3253

A light scattering instrument for in-situ measurements of particles in the 0.2 to 20 micrometer diameter size range is described, and field test results are presented. The instrument is a modified version of an earlier prototype. The upper limit of the size response has been extended from 10 to 20 micrometers, and several component and packaging changes have been incorporated to make the unit more suited to stack particulate emission survey applications. The completed instrument was tested at a coal-fired electric power generating facility. During the test a cascade impactor was used as a referee device and both instruments were run side by side in the outlet duct of the electrostatic precipitator. Results show an excellent correlation between the two instruments with regard to the identification of a 1 micrometers diameter peak in the particle size distribution. A second peak around 20 micrometers was defined by the optical instrument, but could not conclusively be confirmed through the impactor data. The optical instrument handled well during the field test.

PB81-214298 PC **A13**/MF **A01**
Minnesota Univ., Minneapolis. Particle Technology Lab.
Data Reduction Techniques for Aerosol Size Distribution Measuring Instruments.
Progress rept.,
Abde Kapadia. Jun 80, 297p PUB-413, ESRL-RTP-481
Grant EPA-R-804600
Doctoral thesis.

Data reduction methods for the electrical aerosol analyzer (EAA) and the diffusion battery+condensation nuclei counter (DB+CNC) are presented. Both the EAA and DB+CNC can be modeled by the Fredholm Integral Equation of the First Kind. Thus, the data reduction methods for both the instruments are similar. The data reduction methods for both the instruments were analyzed with simulated and experimental data. For the EAA, the comparison between the different data reduction methods for the number distribution is excellent. The agreement between the number distribution retrieved by the three data reduction methods for the DB+CNC was found to be good. Finally, it was shown that for large number mean diameters, the response of the diffusion battery does not change significantly with a considerable change in the dispersion parameter, sigma(g). Thus, the resolution of sigma(g) with the diffusion battery is poor.

PB81-214892 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Microelectronic Test Patterns NBS-12 and NBS-24.
G. P Carver, R. L. Mattis, and M. G. Buehler.
May 81, 41p NBSIR-81-2234

Microelectronic test patterns NBS-12 and NBS-24 are modular developmental patterns for experimentally evaluating improved designs of certain test structures. NBS-12 addresses geometric design considerations for the cross-bridge sheet resistor test structure. NBS-24 contains a variety of preliminary designs for the integrated gated-diode electrometer and a series of variations on the design of the MOSFET dc profiler. Both patterns also include assorted process parameter test structures. Tables of design parameters, functional descriptions of the test structures in each pattern, and computer-composed outline drawings showing all of the test structures are included.

PB81-215725 Not available NTIS
National Bureau of Standards, Washington, DC.
A Simple Method for Cross-Sectional Examination of Wear Debris Flakes.
Final rept.,
P. J. Blau. 1981, 1p
Pub. in Wear Short Commun. 66, p257-258 1981.

This brief note covers a precedure which can be used for mounting and cross-sectioning thin flakes of metallic wear debris (25-250 micrometers in size). The mounts can be used for metallographic studies of debris structure or for measurements of debris dimensions. The basic procedure involves the use of a glass coverslip sandwich mounted on edge in a standard, room temperature curing epoxy mount.

PB81-222853 PC **A06**/MF **A01**
National Physical Research Lab., Pretoria (South Africa). Applied Spectroscopy Div.
Guide to the Evaluation and Use of an Atomic Absorption Spectrophotometer,
R. J. Watling, and I. M. van Maarseveen. May 80, 117p CSIR-SR-FIS-209, ISBN-0-7988-1904-9

This report outlines a method for assessing the capabilities of an atomic absorption spectrophotometer. The instrument used for this study was the Varian-Techtron AA775. However, the method can be applied to any instrument from any manufacturer.

PB81-862609 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Eddy Current Testing and Inspection. January, 1971-July, 1981 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 71-Jul 81.
Jul 81, 205p

This bibliography cites reports concerning nondestructive eddy current testing and inspection techniques and equipment for examining and evaluating a wide variety of materials and objects for the detection of flaws or defects which affect their properties and behavior. (Contains 300 citations fully indexed and including a title list.)

SAND-81-8221 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Computerized Ultrasonic Data Acquisition and Signal Analysis System.
G. H. Thomas, and M. Kelley. May 81, 11p
Contract AC04-76DP00789

Ultrasonic analysis has proven to be a powerful nondestructive evaluation technique. Much of ultrasonics versatility is due to computerization. Computer signal processing and analysis allows the vast quantities of reflector information contained in an ultrasonic echo to be extracted and assimilated. A computerized, ultrasonic nondestructive evaluation facility has been developed at Sandia National Laboratories in Livermore. This report describes the facility and mentions a few of the studies being considered. (ERA citation 06:024034)

UCRL-84876(Rev.1) PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Design and Fabrication of Large- and Small-Bore Railguns.
A. L. Brooks, R. S. Hawke, J. K. Scudder, and C. D. Wozynski. 13 Mar 81, 16p CONF-801138-5(Rev.1)
Contracts W-7405-ENG-48, W-7405-ENG-36
Electromagnetic guns and launchers conference, San Diego, CA, USA, 4 Nov 1980.

A joint program between the Lawrence Livermore National Laboratory and the Los Alamos National Laboratory was conducted to establish whether railguns could be operated at megampere currents, to set operating limits, and to provide data to validate the modeling of railgun technology. The 12.7- and 50.0-mm-bore railguns designed and fabricated for this program are discussed. The design criteria, the materials and fabrication methods, and the success of the designs are discussed in detail. (ERA citation 06:022430)

14D. Reliability

N81-26467/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Logic Analysis of Complex Systems by Characterizing Failure Phenomena to Achieve Diagnosis and Fault-Isolation.
J. T. Wong, and W. L. Andre. Apr 81, 22p NASA-TM-81291, USAAVRADCOM-TR-81-A-12
Prepared in Cooperation with Army Research and Technology Labs., Moffett Field, Calif. Presented at the Joint Intern. Meeting of Cors and Orsa, Toronto, 3-6 May 1981.

A recent result shows that, for a certain class of systems, the interdependency among the elements of such a system together with the elements constitutes a mathematical structure a partially ordered set. It is called a loop free logic model of the system. On the basis of an intrinsic property of the mathematical structure, a characterization of system component failure in terms of maximal subsets of bad test signals of the system was obtained. Also, as a consequence, information concerning the total number of failure components in the system was deduced. Detailed examples are given to show how to restructure real systems containing loops into loop free models for which the result is applicable.

UCRL-85254 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Reliability Studies of Materials Using Several LSI-11 Based Systems.
K. A. Gertz. 2 Apr 81, 5p CONF-810546-1
Contract W-7405-ENG-48
1981 spring DECUS U.S. symposium, Miami Beach, FL, USA, 18 May 1981.

Valid predictions about the reliability of materials require tests on a large number of samples. The materials must undergo a number of different types of load histories in order to make an accurate definition of the damage function. At LLNL, a test facility was designed that allows material testing of strength and life to be done at the different load histories. The facility uses several LSI-11 microcomputers as multichannel data acquisition systems. Currently, each system operates independently using floppy disks as program and data storage. The floppy disks containing the data are hand carried to a PDP-11/60 minicomputer for data analysis. Each system uses an analog-to-digital (A/D) converter selected to best fit the characteristics of the signal being measured; i.e., a high-speed direct memory access (DMA) A/D for signals with fast rise times, an integrating A/D for signals with an ac component, etc. How the Mechanics of Materials Test Facility is implemented is described. (ERA citation 06:022448)

14E. Reprography

PAT-APPL-6-240 048 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Vibration Stabilized Image Projection System.
Patent Application,
Harry L. Lask. Filed 3 Mar 81, 10p AD-D008 530/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A vibration stabilized image projection system includes a viewing screen supported on a vibratory platform, an image projector supported off the platform in a relatively vibration-free environment for projecting an image toward the screen, and an image stabilizing lens interposed between the projector and screen for providing an optical link between them. The stabilizing lens is supported on the platform for undergoing vibratory movement therewith in X, Y, and/or Z planes and relative to the projector. The lens focuses the image at a stationary position on the screen as the stabilizing lens, screen and platform undergo vibratory movement relative to the projector. (Author)

PB81-870818 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aerial Photography: Its Use in the Study of Coastal Erosion and Pollution. January, 1974-June, 1981 (Citations from Oceanic Abstracts).
Rept. for Jan 74-Jun 81.
Jun 81, 81p

This retrospective bibliography contains citations concerning aerial photography and its use as a means to study coastal shoreline problems such as erosion and pollution, and to survey coastal and land areas. (Contains 82 citations fully indexed and including a title list.)

PB81-872145 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Graphic Reproduction: Techniques and Machinery. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 140p

Equipment and methods for graphic reproduction are considered in this retrospective bibliography. Items discussed include cameras, step and repeat machines, electronic color scanners, electronic proofing systems, computer-aided make-up systems and contact screens. (Contains 105 citations fully indexed and including a title list.)

PB81-872160 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Multicolor Printing. January, 1974-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 74-Jul 81.
Jul 81, 208p

Articles cited in this bibliography discuss the techniques, technology, development, and applications of multicolor printing. Among the techniques and methods covered are Gravure, Screen, Litho, Offset, and One-pass multicolor printing. Topics include special printing on plastics, metals, and glass, and the use and development of new multicolor inks for this purpose. (Contains 153 citations fully indexed and including a title list.)

PB81-872285 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Business Form Printing. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 156p

Articles cited in this bibliography discuss the design, techniques, and the printing processes and machinery involved in the printing of business forms. Topics cover industrial trends, including the trend toward in-house printing. Other subjects cover the use of small computers, ink-jet printing, and conventional printing techniques. (Contains 115 citations fully indexed and including a title list.)

PB81-872376 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Water-Based Printing Inks. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 211p

Articles cited in this bibliography discuss the development, manufacture, properties, and applications of water-based printing inks. Topics include descriptions of various types of water-base inks including Flexographic and Gravure. Reports cover the advantages of water-based inks such as cost reduction, shorter drying time, and pollution reduction. Some citations discuss the current technology and future trends for water-based printing inks. (Contains 170 citations fully indexed and including a title list.)

PB81-872483 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Platemaking and Phototypesetting. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 206p

Articles cited in this bibliography discuss the technology, design, development, and applications of systems using laser platemaking and phototypesetting in the printing industry. Reports describe the current and future trends in technology and applications. References include the use and evaluation of some specific commercial platemaking and phototypesetting systems. Other articles discuss the processes used in litho offset and gravure platemaking using lasers. (Contains 166 citations fully indexed and including a title list.)

PB81-872756 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Label Printing Techniques and Machinery. January, 1976-July, 1981 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 201p

Articles cited in this bibliography discuss the methods, techniques, and the design and development of printing machinery for label printing. Citations cover the current and future trends in techniques and technology and the advantages of in-plant label printing. Also covered are the printing of labels for various products and packaging materials and for the printing of bar codes. The uses of special inks and hot foil stamping are considered. (Contains 159 citations fully indexed and including a title list.)

15. MILITARY SCIENCES

15A. Antisubmarine Warfare

AD-A100 899/4 PC **A03**/MF **A01**
Ketron, Inc., Arlington, VA.
Soviet Perceptions of U.S. Antisubmarine Warfare Capabilities. Volume I. Executive Summary. Revision.
Final rept.,
Robert W. Herrick, Lois S. Lembo, and Mark A. Hainline. Jan 81, 33p Rept nos. KFR-293-80-VOL-1-REV, 315-81-VOL-1-REV
Contract AC9WC116

Revision of report dated 30 Sep 80. See also Volume 2, AD-a101 015.

This study addresses four primary questions: How frequently and in what contexts do the Soviets discuss U.S. ASW capabilities. How have the frequency and nature of Soviet commentaries on the subject changed. What U.S. ASW programs are the particular focus of Soviet commentary. What is the Soviet perception of U.S. anti-submarine warfare capabilities and how has it changed over the period 1960 - 1980. Answers to these and related questions have been derived from qualitative and quantitative content analyses of Soviet open-source national security publications. The commentaries sampled in the analyses - spanning the years 1960 to 1980 - represent the views of naval, military, and party/government leaders and spokesmen. (Author)

AD-A101 015/6 PC **A18**/MF **A01**
Ketron, Inc., Arlington, VA.
Soviet Perceptions of U.S. Antisubmarine Warfare Capabilities. Volume II. Analysis and Conclusions. Revision.
Final rept.,
Robert W. Herrick, Lois S. Lembo, and Mark A. Hainline. Jan 81, 401p Rept nos. KFR-293-80-VOL-2-REV, KFR-315-81-VOL-2-REV
Contract AC9WC116
Revision of Report dated 30 Sep 80. See also Volume 1, AD-A100 899.

This study addresses four primary questions: How frequently and in what contexts do the Soviets discuss U.S. ASW capabilities. How have the frequency and nature of Soviet commentaries on the subject changed. What U.S. ASW programs are the particular focus of Soviet commentary. What is the Soviet perception of U.S. anti-submarine warfare capabilities and how has it changed over the period 1960 - 1980. Answers to these and related questions have been derived from qualitative and quantitative content analyses of Soviet open-source national security publications. The commentaries sampled in the analyses - spanning the years 1960 to 1980 - represent the views of naval, military, and party/government leaders and spokesmen. (Author)

15B. Chemical, Biological, and Radiological Warfare

AD-A100 967/9 PC **A03**/MF **A01**
New Orleans Univ., LA. Dept. of Chemistry.
Detection of Chemical Warfare Agents with a Coated Piezoelectric Quartz Crystal.
Final rept. 25 Apr-30 Sep 80,
George G. Guilbault, Jean Affolter, Yutaka Tomita, and Edward S. Kolesar, Jr. May 81, 27p SAM-TR-81-6
Contract F33615-78-D-0617

Copper complexes have been evaluated for the detection of organophosphorous compounds in air. Diisopropyl methylphosphonate (DIMP) was used as a model for the phosphorous esters. Bidentate copper complexes possessed the highest activity for DIMP; and this effectiveness was evaluated by chemically binding the complex to XAD-4, an experimental resin polymer. The calibration curve is linear between 0 and 20 ppb DIMP (the range investigated). No significant interference from automobile exhaust gas, chosen as a possible pollutant, was observed. (Author)

15C. Defense

AD-A101 141/0 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Low Altitude Defense: An Analysis of Its Effect on MX Survivability.
Master's thesis,
James T. Moore. Mar 81, 105p Rept no. AFIT/GST/OS/81M-10

This thesis investigates MX survivability when a terminal ballistic missile defense system known as Low Altitude Defense (LOAD) is deployed. LOAD will defend the MX missile with three high-speed, nuclear armed interceptor missiles. This research determines a best strategy for the use of the interceptors. The deployment of LOAD with its best strategy is compared to increases in MX shelter hardness to determine which is the more effective method of improving MX survivability. (Author)

15E. Logistics

AD-A100 687/3 PC **A02**/MF **A01**
Army Inventory Research Office, Philadelphia, PA.
OSD Stockage Policy Analysis: A Summary.
Final rept.,
W. Karl Kruse. May 81, 23p Rept no. IRO-282

This report is a summary of and a guide to the final report of the OSD Stockage Policy Analysis Working Group. The Working Group was formed to study issues which were raised by the Office of Management and the Budget. Topics studied were implementation of VSL/EOQ, control of manual ajdustment to levels, non-demand based stockage, causes of long supply, and the use of program data. (Author)

AD-A100 847/3 PC **A08**/MF **A01**
Logicon, Inc., Lexington, MA.
AIRMICS LARE/CADSAT Analysis.
Final rept.,
Kim M. Terrell, and Larry A. Johnson. 30 Apr 81, 171p Rept no. R81003(A)
Contract DAHC26-80-C-0021

This study was conducted to determine the applicability of Logicon's Automated Requirements Engineering (LARE) methodology in the Army logistics support environment. Logicon developed LARE to provide a means to define, effectively analyze, and maintain system requirements. LARE includes a coherent set of procedures which allows analysts to define/analyze requirements using computerized tools. The Computer Aided Design and Specification Analysis Tool (CADSAT) was used on this project. CADSAT was designed to aid structured documentation and analysis of large processing systems. This project used the Air Force's standard CADSAT with the CADSAT extensions developed by Logicon.

AD-A100 892/9 PC **A02**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation Mathematics and Logistics Dept.
UNIVAC 494 Teletype Emulation Using a Microcomputer.
Departmental rept.,
M. A. Wallace, L. J. Junod, W. C. Gorham, and K. V. Wright. May 81, 16p Rept no. DTNSRDC/CMLD-81/10

This report provides information on the microcomputer-based model 33 teletype emulator software used to connect an experimental on-line stock levels recomputation system to a UNIVAC 494 mainframe computer located at the Navy Ships Parts Control Center, Mechanicsburg, Pennsylvania. The report includes an overview of emulator concepts, capabilities, usage and organization. (Author)

AD-A100 977/8 PC **A04**/MF **A01**
General Accounting Office, Washington, DC.
Adjustments Recommended in Fiscal Year 1982 Ammunition Procurement and Modernization Programs.
30 Jun 81, 56p Rept no. GAO/PLRD-81-35

Our objectives were to assess the adequacy of justifications for specific ammunition items and projects in the fiscal year 1982 appropriation request, assess actions taken by the Department of Defense with respect to the single manager for conventional ammunition program, and make inquiries into minimum sustaining rates, the working capital fund, and the small arms ammunition reload program.

AD-A101 139/4 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Strategic Airlift: U.S. to Europe.
Master's thesis,
Eric Kalei Holck, and Robert W. Ticknor. Mar 81, 119p Rept no. AFIT/GST/OS/81M-7

This thesis studies the problem of determining wartime military airlift capability and factors within the military airlift system which produce significant changes in system capability as measured in tons of cargo delivered after 30 days of system operation. The airlift mission is set in a scenario which requires the reinforcement of Western Europe against a Warsaw Pack attack. This reinforcement is provided by C-141 and C-5 aircraft. To examine the performance of the airlift system, a simulation model was created using the SLAM simulation language. This model encompasses the four major subsystems within the airlift system; these subsystems are aircrew, maintenance, supply, and aerial port. These subsystems employ resources which are pooled at two locations (one in the United States, and one in Europe). A five-factor, two-level factorial design is employed to reveal those factors that produce significant changes in system capability. A total of 32 simulations were performed and the results were subsequently run through an analysis of variance (ANOVA) algorithm. The five factors investigated are: time to spare parts depletion; resupply time distributions; number of C-141s; number of cargo loading equipment; and the cargo load availability rate.

AD-A101 145/1 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Parametric Analysis of Three Models for Direct Delivery by a Naval Supply Center to a Naval Air Rework Facility.
Master's thesis,
Mary Ellen Davidson. Mar 81, 55p

This thesis provides a parametric analysis of three models for direct delivery by a Naval Supply Center (NSC) to a Naval Air Rework Facility (NARF). The models include both scheduled and unscheduled deliveries. Parameters which were studied included the ratio of delay cost to delivery cost and the probability of a repair part being demanded by a component undergoing repair. The decision variables were the time between deliveries for scheduled deliveries and the number of units of an item delivered for unscheduled deliveries. The impact on the decision variables of varying the parameters was the major focus of the analysis. The results of the analysis suggest that scheduled delivery is a good direct delivery strategy for an NSC to use in supporting a NARF. However, the analysis has shown that the expected total cost for all three alternatives is very close. Therefore, the final criterion for which alternative should be chosen is essentially ease of usage and implementation.

15F. Nuclear Warfare

PB81-871287 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
War Gaming for Strategic and Tactical Nuclear Warfare. January, 1970-July, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jul 81.
Jul 81, 96p

This bibliography contains citations about non-QUICK war gaming for strategic and tactical nuclear warfare. Analyses and comparative evaluations, based upon computerized simulations, are considered as are manuals and specification for the various computer programs employed. STAGE 64 and SATAN II and III are covered prominently. (Contains 72 citations fully indexed and including a title list.)

15G. Operations, Strategy, and Tactics

AD-A100 745/9 PC **A04**/MF **A01**
Decisions and Designs, Inc., McLean, VA.
Application of Advanced Decision-Analytic Technology to Rapid Deployment Joint Task Force Problems.
Interim technical rept.,
Robert B. Pirie, Jr., Gary A. Frisvold, and Terry A. Bresnick. Jun 81, 71p Rept no. TR-81-7-328.13
Contract MDA903-81-C-0192, DARPA Order-4090

The primary task of this project was to demonstrate the application of advanced decision-analytic technology to the problems of an operational military staff, in this case the Rapid Deployment Joint Task Force (RDJTF) staff. A secondary task was to determine the usefulness of advanced decision-analytic products to the RDJTF staff, and transfer, if possible, a decision-analytic capability for a specific problem to them. As a result of discussions with RDJTF personnel, Decisions and Designs, Inc. (DDI) selected a problem that seemed most promising in terms of applying advanced techniques and of providing the RDJTF with a useful product in the near term. This problem concerned the provision of an adequate support architecture in the Persian Gulf/Indian Ocean area for the deployment of the RDJTF. DDI constructed a hierarchical resource allocation model to demonstrate the feasibility of optimizing the support architecture for deployment forces of different sizes, by making trade-offs within and between base structure, prepositioned materiel, and airlift/sealift assets. To avoid classification problems, hypothetical values were assigned to the parameters of the model. However, the base structure submodel was built in close consultation with members of RDJTF staff, and actual costs and effectiveness estimates were produced. These cost and the effectiveness estimates will greatly facilitate prioritization of support for military construction programs, permit rapid exploration of the usefulness of new proposed base options, and add to understanding whether and how decision-analytic techniques can be transferred to military operational staffs. (Author)

AD-A101 012/3 PC **A10**/MF **A01**
Georgetown Univ., Washington, DC. Center for Strategic and International Studies.
Conference Report on the Future of Maritime Strategy (April 1, 1980) and Geopolitics and Maritime Power (September 17-18, 1980).
Bradford Dismukes, Michael McGwire, Jeffrey Record, Francis J. West, and R. James Woolsey. 1980, 213p
Contract N00014-78-C-0437

This report contains the findings from two conferences held at the Center for Strategic and International Studies, one on April 1, 1980 on The Future of Maritime Power, and the other on September 17, 1980 on Geopolitics and Maritime Power. There is some inevitable overlap between the findings of the two conferences, but the proceedings of each have been reported on separately. (Author)

AD-A101 103/0 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Application of Living Systems Theory to Combat Models.
Master's thesis,
Raymond R. Crawford, Jr. Mar 81, 96p

This thesis proposes a framework for icorporating organizational aspects in combat models. It begins by explaining Dr. James G. Miller's Living Systems Theory (LST) as a possible framework. Included in this discussion is a review of the basic nature and potential of LST. A review of the Army's involvement with LST and its present status is discussed. Recommendations are made for supplemental research which may help to develop this framework for the Army. A review explains present combat model limitations for describing organizational phenomena in combat. Finally, a methodology is proposed to integrate the results of LST into combat models of the future. Included as an Appendix, is a discussion of General Systems Theory which will help to explain the basis for LST. (Author)

AD-A101 128/7 PC **A05**/MF **A01**
National Defense Univ., Washington, DC. Research Directorate.
Guerrilla Warfare: Cause and Conflict (A 21st Century Success Story.),
Walter R. Thomas. 1981, 91p Rept no. NATL SEC ESSAY SER-81-3

Guerrilla force have conducted irregular warfare-with varying degrees of intensity and success-in all ages and all regions of the world, from biblical times to the present. This essay contends that this spectre will haunt the world even more menacingly in the twenty-first century. It states that an overpopulated earth, combined with the failure of governments to meet the social needs of their people, is driving the disillusioned and despairing ever more rapidly toward active participation in, or support of, guerrilla organizations. Although this essay is oriented toward the year 2000 and beyond, the author notes that the emotional forces which ignite conflicts already exist in most of the underdeveloped nations and soon will jolt more advanced societies as well. Actions that national leaders might take to lower the threshold of threat and to deter the growth of guerrilla organizations are suggested, together with the observation that many of the deterrents would be difficult to implement within democratic societies.

AD-A101 134/5 PC **A05**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
A Detailed Review of the TACWAR Model.
Technical memo.,
John C. Ingram. Dec 80, 80p Rept no. HDL-TM-80-15
See also HDL-TR-1918.

A review of the TACWAR theater-level combat simulation model has been completed as an initial prerequisite to the primary objective of augmenting TACWAR to include Command, Control, and Communications Degradation considerations. This review has revealed a number of logic and programming bugs in the model that could also have remained undetected in other versions of the model throughout the TACWAR community of interest. It is the intent of the author to help the community eliminate these potential errors by cataloging them point by point and by recommending corrections. (Author)

AD-A101 164/2 PC **A06**/MF **A01**
General Electric Co., Santa Barbara, CA. TEMPO.
Analysis and Modeling of Battlefield Fire Plumes.
Final rept.,
James H. Thompson, and John g. Devore. Feb 81, 110p ERADCOM/ASL-CR-81-0072-2
Contract DAAD07-80-C-0072

This report presents models for the hot turbulent plumes above tactical battlefield fires. Models are developed for the plume radius, temperature, and rise velocity as a function of altitude given the initial fire conditions. The strength of the hot air turbulence is related to the plume parameters for several assumed flow conditions. The turbulent propagation effects are evaluated for optical beams whose paths intersect the plume. Sample results are presented for coherence length, short- and long-term beam spreading, and beam jitter. (Author)

MISSILE TECHNOLOGY

16D. Missiles

AD-A101 071/9 PC **A04**/MF **A01**
Systems Consultants, Inc., Dayton, OH. Ridgecrest Div.
DAIS Models Simulation System (DMSS).
Final rept. 14 Jun 79-14 Nov 80,
Audrey C. Brewer. May 81, 57p AFWAL-TR-81-1053
Contract F33615-79-C-1739

The DMSS software support effort enhanced the capabilities and value of DMSS by accomplishing the following four objectives: (1) Addition of VATS/Pave Tack and Maverick Missile models; (2) Enhancing the existing software; (3) Creating meaningful, up-to-date documentation; and (4) Providing comprehensive training. The new models were developed using top-down structuring techniques and were implemented in RATFOR (a structured FORTRAN preprocessor). The existing models were restructured using top-down structuring techniques, RATFOR, and meaningful comments. The documentation was updated to adhere to MIL-STD-483 and 490. (Author)

AD-A101 130/3 PC **A06**/MF **A01**
Sperry Systems Management, Huntsville, AL.
Design Guide, Built-In-Test (BIT) and Built-In-Test Equipment (BITE) for Army Missile Systems.
Final technical rept.
15 Apr 81, 120p SP-212-1071, DRSMI/RL-CR-81-4
Contract DAAK40-79-D-0020

This report documents the first draft of a design guide and has been prepared as an aid to the project manager, beginning with the conceptual phase through development, and as a guide to the system design engineer concerned with the incorporation of built-in-test (BIT) and built-in-test equipment (BITE) into the weapon system. It is not the intent of this document to detail the how to but rather to identify those subject areas that need to be considered in determining the requirement for BIT. (Author)

AD-A950 548/8 PC **A03**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Nondestructive System for Inspection of Fiber Glass Reinforced Plastic Missile Cases and Other Structural Materials.
Quarterly status rept. no. 7, 29 Dec 62-28 Mar 63,
Jay P. Mitchell, Merle L. Rhoten, and Robert C. McMaster. May 63, 40p WAL-TR-142.5/2-7
Contract DA-33-019-ORD-3670
Supersedes AD-430 568.

No abstract available.

AD-A950 549/6 PC **A04**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Nondestructive System for Inspection of Fiber Glass Reinforced Plastic Missile Cases and Other Structural Materials.
Quarterly status rept. no. 8, 29 Mar-28 Jun 63,
Jay P. Mitchell, Merle I. Rhoten, and Robert C. McMaster. Aug 63, 56p WAL-TR-142.5/2-7A
Contract DA-33-019-ORD-3670
Supersedes AD-433 002.

No abstract available.

17

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A100 706/1 PC **A02**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA.
Simulation of Underwater Diversity Array.
Quarterly progress rept. no. 33,
Fred Haber, and Paul Yeh. 12 Nov 80, 12p
Contract N00014-77-C-0252

The objective of the system is to approach a condition in which the multiple ray arrivals from a distant source are separately received and coherently combined. Because the analytical forms giving the final output signal-to-noise ratio (SNR) are too involved for direct computation, simulation experiments were carried out. Results of this work are presented for the system described which is based on maximal ratio combining (MRC) of the multiple rays formed. At the same time certain other cases were simulated in order to see what magnitude of improvement is obtained using this method over simpler ones. Given below are results for (1) a three-dimensional array with multiple beams (branches) using only coherent phasing of branches (known as equal gain combining (EGC), (2) a three-dimensional array with multiple beams using selection of the maximum amplitude branch (known as selection combining (SC)), (3) a three-dimensional array with a single fixed focus beam, and (4) two-dimensional array.

AD-A100 707/9 PC **A02**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA.
Multipath in the Three-Dimensional Underwater Array.
Quarterly progress rept. no. 31,
Fred Haber. Nov 79, 12p
Contract N00014-77-C-0252

A planar array of widely dispersed hydrophones deployed in a horizontal plane several hundred meters below the surface of the sea was analyzed. Because of the dispersive nature of the underwater medium, signal energy approaches the array from a source along a number of refracting paths. This results in multipath interference and a possible consequent loss of output. Ray arrivals from the source typically fall into a range of vertical angles at the receiver which are + or - 10 relative to the horizontal. The vertical beamwidth of a planar antenna is large enough to accept all rays in such a range, hence it is multipath sensitive. A three-dimensional array is capable of a sharper vertical focus and will be less sensitive to the kind of multipath typical in this application. In fact, by suitably processing the array output there is the possibility that the multipath arrivals can be separately received and then combined in phase to achieve an 'angle of arrival diversity' system. Such systems have been proposed for tropospheric scatter receivers.

AD-A100 758/2 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Target Tracking Based on Bearing Only Measurements,
Svein Fagerlund. Jun 80, 136p Rept no. LIDS-R-1003
Contract N00014-77-C-0532

This report develops 10 different approaches to the target tracking problem based on bearing only observations. Its purpose is to form the basis for an extensive simulation study, aimed at achieving the best possible tracking performance for this tracking problem. Included in the report are also a proposed initialization routine for bearing only trackers, and a maneuver detection algorithm with a proposed action scheme following the maneuver detection. (Author)

AD-A101 113/9 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
An Integrated Approach to Signal and Image Processing for Ocean Acoustics.
Technical rept.,
C. H. Chen. 29 Jun 81, 19p Rept no. SMU-EE-TR-81-10
Contract N00014-79-C-0494

An integrated systems approach is presented that includes both signal and image processing capability, and the use of command processor to coordinate the operation of all processors, and to make intelligent interpretation of real environment and to extract desired information from noisy background. Both statistical image segmentation and time-delay estimation are examined in this context. (Author)

PB81-217218 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Tracking Near Surface Drogues Using and Acoustic Travel Time Technique in Shallow, Highly Stratified Water- Problems and Observations.
Technical rept.,
James H. Churchill. May 81, 49p WHOI-81-37
Contract DE-ACO2-79EV10005, Grant 03-5-022-26

During July and August of 1980 near surface water velocities of Lake Huron were measured by tracking drogues, equipped with sonobuoys, using an acoustic travel time technique. Prior to these experiments difficulties associated with acoustic ray bending in the shallow, highly stratified environment were anticipated. Simple models were developed to predict the errors in drogue position and velocity determination resulting from ray bending. During the experiments round trip travel times of acoustic pulses transmitted between three bottom transponders and a transducer (lowered from a ship) were recorded. Evidence also indicated that increased thermocline depth resulted in decreased tracking range.

17B. Communication

AD-A100 618/8 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Models of Conflict, with Explicit Representation of Command and Control Capabilities and Vulnerabilities.
Technical rept.,
Donald P. Gaver. Feb 81, 50p Rept no. NPS55-81-008

This report describes dynamic combat models that reflect the effect of information flows together with attrition capability upon combat progress and outcome. Command and Control assets for each participant are modeled as endowed with the capacity to guide combat; C2 is also vulnerable in that it may be deliberately targetted and reduced in effectiveness. Physical attrition is modeled first by a deterministic rate process (Lanchesterian in nature), secondly by a stochastic process related to the first by ideas related to those of stochastic difference and differential equations. The models are best exercised and explored on an interactive computer display. A FORTRAN program exists for this purpose, with displays of hypothetical historical combat outcomes new appearing in tabular form. Graphical displays will be provided in future work. It seems likely that this model simulation can be developed into a gaming tool, very conveniently playable by two persons who can elect various strategies for force allocation, play the game, and learn from the results. An elaboration of the model may serve as a means for assessing the importance of increased effectiveness of equipment, either with respect to firing rate and accuracy or time for information flow. (Author)

AD-A100 629/5 PC **A04**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Computer Science.
Noise Suppression Methods for Robust Speech Processing.
Final technical rept. 1 Oct 78-31 Mar 81,
Steven F. Boll, James Kajiya, James Youngberg, Tracy Lind Petersen, and H. Ravindra. Apr 81, 53p Rept no. UTEC-CSC-81-020
Contract N00173-79-C-0045, ARPA Order-3301

Robust speech processing in practical operating environments requires effective environmental and processor noise suppression. This report describes the technical findings and accomplishments during the reporting period for the research program funded to develop real-time, compressed speech analysis-synthesis algorithms whose performance is invariant under signal contamination. Fulfillment of this requirement is necessary to insure reliable secure compressed speech transmission within realistic military command and control environments. Overall contributions resulting from this research program include the understanding of how environmental noise degrades narrow band, coded speech, development of appropriate real-time noise suppression algorithms, and development of speech parameter identification methods that consider signal contamination as a fundmental element in the estimation process. This report describes the research and results in the areas of noise suppression using the dual input adaptive noise cancellation articulation rate change techniques, spectral subtraction and a description of an experiment which demonstrated that the spectral substraction noise suppression algorithm can improve the intelligibility of 2400 bps, LPC-10 coded, helicopter speech by 10.6 points. In addition summaries are included of prior studies in Constant-Q signal analysis and synthesis, perceptual modelling, speech activity detection, and pole-zero modelling of noisy signals. Three recent studies in speech modelling using the critical band analysis-synthesis transform and using splines are then presented. Finally a list a major publications generated under this contract is given. (Author)

AD-A100 667/5 PC **A05**/MF **A01**
Allen Clark Research Centre, Towcester (England).
Hermetically Sealed High Radiance LEDs for Fibre Optic Communications.
Final rept. Apr 79-Jun 80,
R. C. Goodfellow, J. Humpage, and R. Davis. Oct 80, 87p CD.6500662, AFWAL-TR-80-1163
Contract F49620-79-C-0045

This report describes the development of hermetically sealed pigtailed LEDs for Fibre Optic Communications. Hermeticity to MIL STD 7503, 1017 is achieved by a fibre metallisation/solder method, high efficiency and speed (3 nanosecs typical) by optimised GaAs-GaA1As proton isolated junction, and high output power by microlens coupling (800 micron w typical in a 100 micrometers core diameter 0.3NA pigtail). (Author)

AD-A100 668/3 PC **A02**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Facility Design Criteria AN/GSC-39(V)1 Earth Terminal Complex Fixed Site Configuration. Addendum I. HEMP Considerations.
Special rept.,
Samuel A. Clark, Jr., Ronald J. Chase, and James D. Penar. Mar 81, 17p Rept no. HDL-SR-80-3
Addendum 1 to Rept. no. HDL-PRL-79-25.

This addendum provides high altitude electromagnetic pulse (HEMP) hardening design criteria for the AN/GSC-39 Earth Terminal Complex fixed site facilities. In addition to other criteria, this addendum is to be used for preparing construction plans and specifications for the earth terminal complex. These HEMP criteria are based on two reports for HEMP hardening of the AN/FSC-78 Satellite Com-

munications Terminal. The hardening measures developed in this Addendum will enhance protection for the digital communications subsystem. (Author)

AD-A100 684/0 PC **A03**/MF **A01**
Electronic Systems Div., Hanscom AFB, MA.
Future Air Force Tactical Communications,
Donald B. Brick, and Fred W. Ellersick. 27 Sep 79, 26p Rept no. ESD-TR-80-148
Pub. in IEEE Transactions on Communications, vCOM-28 n9 p1551-1572 Sep 80.

No abstract available.

AD-A100 766/5 PC **A05**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Fiber Optic Data Bus for Marine Corps Command-Control Systems.
Final rept. Oct 78-Sep 80,
A. Schaefer, D. Butts, and J. Wildermuth. Feb 81, 89p Rept no. NOSC/TR-661

A five-terminal data bus operating at 1 Mbps was built, tested and evaluated using state-of-the-art fiber optic components. The data bus utilized a modified MIL-STD-1553B protocol and was operated with a central controller and also a distributed bus control algorithm. Problems associated with the USMC Command-Control data bus were identified. (Author)

AD-A100 768/1 PC **A03**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
Evaluation of Color Underwater TV and Topside Equipment.
Test rept.,
Jerry D. Pelton, and Laurence T. Bussey. Jan 81, 45p Rept no. NEDU-1-81

Five commercially available underwater, handheld, color cameras and TV systems were tested for use by divers to help perform in-water hull and waterfront inspections. The camera systems are evaluated and rated by how well they fulfill specific critical parameters related to this application. (Author)

AD-A100 781/4 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Investigation of Continuously Variable Slope Delta Modulator/Demodulator Compatability.
Master's thesis,
Jeffrey Allan Lersch. Dec 80, 168p Rept no. AFIT/GE/EE/80D-28
Availability: Microfiche copies only.

A computer model of the continuously variable slope delta voice encoding system specified in the draft STANAG on 'Analogue/Digital Conversion of Speech Signals for Tactical, Digital Area Communication Systems', dated June 1978, is developed and implemented in FORTRAN IV. The model's performance is then characterized in terms of idle channel noise, total harmonic distortion, intermodulation distortion, signal-to-noise ratio, and frequency response. For each of these attributes, the system's performance is presented graphically and compared to the criteria established in the draft standard. The model is then exercised by varying the system parameters to the limits imposed by the standard and the resulting performance compared to the previously determined ideal system performance. The results show that the performance characteristics measured are most sensitive to the primary integrator response and output filter response when the system parameters are restricted to the range allowed by the draft NATO standard. (Author)

AD-A100 787/1 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Prototype and Software Development for Universal Network Interface Device.
Master's thesis,
Lee R. Baker. Dec 80, 81p Rept no. AFIT/GCS/EE/80D-4

This thesis describes the third phase of the development and testing for a flexible message processor designed for computer communications network applications. This message processor is microcomputer based and is called a Universal Network Interface Device (UNID). The thesis describes the upgrading of the two system monitors, the design of two memory boards, the development of a test plan for testing the device, and the results of the testing that was performed. The device employs two microcomputer boards, a local card, a network card and two memory boards to provide the capability to interface local users to a computer communications network. The device also provides the capability to act as the node connecting two networks operating under dissimilar protocols. The purpose of this investigation was to have an operational UNID. This investigation was limited to the development and testing of the prototype UNID and the software to support it. No attempt was made to integrate the prototype into an actual computer communications network.

AD-A100 788/9 PC **A12**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Simulation and Analysis of AUTODIN II Network Design.
Master's thesis,
James W. Healy, and Denzel H. Henderson. Dec 80, 274p Rept no. AFIT/GCS/EE/80D-9

The AUTODIN II computer communications network is expected to provide for present and future Department of Defense communications requirements. The proposed AUTODIN II network configuration is designed to provide reliable communications and minimal time delay for both interactive and timesharing and transaction-oriented systems. As development towards an operational network proceeds, questions concerning efficiency and optimality of the network are asked by both the design managers and future AUTODIN II users. To answer these questions, a simulation program at the switch control module (SCM) hierarchal level was developed. It allows the user to: (1) Change the configuration network connectivity and add or delete nodes, SCMs, links and lines; (2) Generate various communication traffic levels from any source location and to any destination location; (3) Define network parameters, such as priorities, percentages of packet sizes, transmission times and special workload identification; and (4) Perform any of the previous options dynamically to analyze the effects of network configuration failures or catastrophic events. A user's manual is provided.

AD-A100 793/9 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of a Resource-Sharing Network Link.
Master's thesis,
Thomas M. McLeod. Dec 80, 131p Rept no. AFIT/GE/EE/80D-30

A resource-sharing (R-S) computer network link design is presented. The design complies with requirements for the Automated Management System (AMS) being developed by the Air Force's Aeronautical Systems Division (ASD). The design includes Texas Instruments Model 990 computers that currently exist in the AMS Network. R-S software was designed that binds existing modules into, effectively, one R-S process at each end of the link. The two R-S processes cooperate in accordance with R-S protocols to accomplish the specified R-S functions. Existing capabilities of the DX-10 operating system were used extensively. The processes communicate via telephone circuits using TI 3780 Emulator software and standard data communications hardware. The R-S functions implemented include file transfer, program file transfer, and remote program execution, as well as others. A unique interface to the DX-10 operating system was designed to allow the R-S software to have adequate access to the operating system. The operating system batch command was emulated, allowing the R-S program to construct a batch file containing any operating system commands that would normally be entered from a interactive terminal. (Author)

AD-A100 807/7 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Automatic Recognition of Phonemes Using a Syntactic Processor for Error Correction.
Master's thesis,
Robert B. Taylor. Dec 80, 90p Rept no. AFIT/GE/EE/80D-45

An algorithm was developed and partially implemented to integrate the use of a phoneme recognizer and a syntactic error corrector for continuous speech recognition. The recognizer uses LPC reflection coefficients as a feature set and makes decisions based on the computation of pairwise likelihood ratio tests for M phonemes. The syntactic error corrector uses a backtracking perser to perform phonological rule and grammatical error correction. A computer program is included to provide interactive training with a Tektronix 4010 terminal on a Data General NOVA/ECLIPSE computer system. (Author)

AD-A100 826/7 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Transmission Loss Prediction for the AN/TRC-97A Over a Tropospheric Scatter Path.
Master's thesis,
H. Stephen Story. 12 Dec 80, 123p Rept no. AFIT/GE/EE/80D-40

This research investigates transmission loss predictions for a short range tactical troposcatter radio system. The analysis is based on the AN/TRC-97A radio set, but the conclusions reached should apply to similar troposcatter systems operating at frequencies from 4.4 to 5.0 GHz and over distances of 160 km or less. A general analysis of the troposcatter path is performed to determine the sensitivity of the transmission loss of the various phenomena which contribute to the loss. That component of the loss which is unique to the scattering process is studied in further detail and a modified scattering loss model is developed. A procedure for determining the coefficients of the scattering loss model based on observed transmission loss is described. A preliminary analysis of the path data available for this research is performed. It is found that the received power probability distribution for the observed paths does not agree with the theoretical distribution in all cases. Further, the available path data is seen to lack sufficiently detailed path geometry information to complete the analysis of the scattering loss model. Recommendations concerning data requirements and continued research are offered. (Author)

AD-A100 842/4 Not available NTIS
Illinois Univ. at Urbana-Champaign.
Kronecker Sequences for Spread-Spectrum Communication,
W. E. Stark, and D. V. Sarwate. 21 Jul 80, 7p ARO-15492.10-EL
Grants DAAG29-78-G-0114, NSF-ENG78-06630
Availability: Pub. in IEE Proceedings, v128 pt F n2 p104-109 Apr 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 843/2 Not available NTIS
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
Performance of Offset Quadriphase Spread-Spectrum Multiple-Access Communications,
F. D. Garber, and M. B. Pursley. 26 Jun 80, 12p ARO-15492.9-EL
Grant DAAG29-78-G-0114
Availability: Pub. in IEEE Transactions on Communications, vCOM-29 n3 p305-314 Mar 81. (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 998/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Burst-Mode Atmospheric Optical Communication.
Journal article,
Jeffrey H. Shapiro, and Robert C. Harney. 1980, 8p MS-5475, ESD-TR-81-65
Contract F19628-80-C-0002
Pub. in Proceeding of National Telecommunications Conference, Houston, TX, 30 nov-4 Dec 80, p27.5.1-27.5.7.

No abstract available.

AD-A100 999/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Flexible Routing Algorithm for the Future Defense Switched Network.
Journal article,
Harold M. Heggestad. 1980, 6p MS-5431, ESD-TR-81-64
Contract F19628-80-C-0002
Pub. in Proceedings of National Telecommunications Conference, Houston, TX, 30 nov-4 Dec 80, P74.3.1-74.3.5.

No abstract available.

AD-A101 000/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
System Design and Technology Development for an EHF Beam-Hopped Satellite Downlink.
Journal article,
Pat R. Hirschler-Marchand, Carl D. Berglund, and Mark L. Stevens. 1980, 8p MS-5418, ESD-TR-81-63
Contract F19628-80-C-0002
Pub. in Proceedings of National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p17.5.1-17.5.7.

No abstract available.

AD-A101 002/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Frequency Agile Phase-Locked Loop Synthesizer for a Communications Satellite.
Journal article,
Russel R. Rhodes, Ben H. Hutchinson, and Warren K. Hutchinson. 1980, 7p MS-5365, ESD-TR-81-59
Contract F19628-80-C-0002
Pub. in Proceedings of National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p22.3.1-22.3.6.

No abstract available.

AD-A101 004/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Design and Performance of a SAW-Based MFSK Demodulator.
Journal article,
Paul F. Mckenzie, Ben H. Hutchinson, and David B. Coomber. 1980, 6p MS-5388, ESD-TR-81-61
Contract F19628-80-C-0002
Pub. in Proceedings of National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p22.6.1-22.6.5.

No abstract available.

AD-A101 005/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Up-Link Propagation and Adaptive Optics.
Journal article,
Darryl P. Greenwood, Jan Herrmann, and Merek Elbaum. 1980, 7p MS-5399, ESD-TR-81-62
Contract F19628-80-C-0002, ARPA Order-600
Pub. in Proceedings of National Telecommunications Conference, Houston, Tx, 30 Nov-4 Dec 80, p27.3.1-27.3.5. Prepared in cooperation with Riverside Research Inst., New York.

No abstract available.

AD-A101 013/1 PC **A04**/MF **A01**
City Coll., New York.
Acquisition, Image and Data Compression.
Final rept. 1 Mar 77-28 Feb 81,
Donald L. Schilling, and George Eichmann. 15 Apr 81, 56p 5137-4, AFOSR-TR-81-0536
Grant AFOSR-77-3217
Availability: Microfiche copies only.

This report discusses four topics: (1) Operation of a frequency acquisition aid to acquire a direct sequence or frequency hopped signal. The acquisition aid employed is a FFT, and repeated measurements are employed to reduce the probability of error; (2) Multiple access using dynamic reservations. Here a new multiple access technique is described in which reservations are made which indicate whether the number of packets to be transmitted is to be increased or decreased. This technique is compared to the generally used procedure of indicating in the reservation the exact number of packets to be sent, a technique which requires significantly more bandwidth. (Author)

AD-A101 028/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
MILSATCOM System Link Availability Prediction for Polar and Inclined Orbits.
Journal article,
Leonard M. Schwab. 30 Nov 80, 6p MS-5367, ESD-TR-81-60
Contract F19628-80-C-0002
Pub. in Proceedings of the National Telecommunications Conference, Houston, TX, 30 Nov-4 Dec 80, p17.2.1-17.2.5 1980.

No abstract available.

AD-A101 054/5 PC **A03**/MF **A01**
Delta Information Systems, Inc., Jenkintown, PA.
Automatic Assessment of the Quality of Group 3 Facsimile Transmission.
Final rept.,
Richard A. Schaphorst. May 81, 28p NCS-TIB-81-5
Contract DCA100-80-C-0042

Group 3 facsimile equipment transmits an end of line code (EOL)which uniquely defines the end of one scan line and the beginning of the next. In a sense this code is redundant information and therefore can be used to detect the occurrence of a transmission error in the scan line immediately preceding the EOL code. Stated another way, if the EOL code does not occur at the anticipated location in the data stream, it is assumed that a transmission error has occurred in the preceding scan line. If one isolated scan line is in error, the subjective effect is usually minimal and the information content is maintained. If however, many scan lines in a row are perturbed the image could be seriously distorted with the attendant user dissatisfaction. It is possible for the receiver to detect the occurrence of a scan line error, accumulate this information for many lines, and terminate transmission if too many scan lines are in error. The purpose of this study is to develop test data to determine the algorithms for accepting or rejecting an image transmission using scan line error data.

AD-A101 055/2 PC **A17**/MF **A01**
National Communications System, Washington, DC.
Specifications of CCITT Signalling System Number 7.
Technical information bulletin.
May 81, 378p Rept no. NCS-TIB-81-3

This Technical Information Bulletin (TIB) reprints CCITT Study Group XI Document 393, which was Part III B of the Study Group XI report to the VIIth CCITT Plenary Assembly. Signalling System No. 7 is the international standard common channel signalling system for exchanging telephone signalling and supervisory information between digital telephone central offices.

AD-A101 077/6 PC **A05**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
C3 Modified TACWAR Model.
Technical rept.,
John C. Ingram. May 81, 76p Rept no. HDL-TR-1918

The TACWAR theater-level combat simulation model has been modified to include command, control, and communications degradation (C3/D). Specific areas where C3/D has been incorporated include combat division assets, corps-sector assets, and theater (COMMZ) assets. The results of C3/D impact division combat effectiveness, nuclear and chemical authorization and release processing delays, target acquisition delays, and nuclear and chemical delivery system and warhead inventory effectiveness. The C3/D modified TACWAR model has been run using an unclassified 'benchmark' data base. Communications degradation and message processing delay data are provided by the TACNET theater-level C3 model. Parametric studies reveal the effect of C3/D on the results of theater-level engagements. (Author)

AD-A101 099/0 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Error Probability Characteristics for Multiple Alternative Communication with Diversity, but without Fading.
Technical rept.,
Albert H. Nuttall. 4 May 81, 40p Rept no. NUSC-TR-6473

The M-ary character error probability, Pe, for a communications system employing D-fold diversity combination is derived and evaluated for the case of no fading, over the range of parameters M = 2, 3, 4, 8, 16, 32, 64, 128, 256, 512, 1024 and D = 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64 for Pe in the range .1 to .00001. The curves presented allow for ready determination of the additional signal-to-noise ratio required for employing diversity when it is not necessary, or when uncertainty forces it upon the receiver processing. Extensions to a thresholding receiver and to a very general class of signal fading are also made, but no numerical results are given for these latter cases. (Author)

AD-A101 104/8 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Soviet Command and Control in an Historical Context.
Master's thesis,
Jeffrey Arthur Kern. Mar 81, 202p

An examination is made of the historical antecedents of present day command and control doctrine in the Soviet Union. The continuity of principal characteristics is demonstrated. The ideological determinants shaping the command and control system are first developed. These include centralism, collective decision-making, unity of command, and redundancy. Practical consequences of these are explored. The functioning of Soviet command and control during World War II is addressed in detail, with emphasis on the uniquely Soviet aspects. Current Soviet command and control concepts are addressed in a general way and linked to historical precedents and ideological precepts. Primary source materials are open Soviet doctrinal and historical publications, in translation. (Author)

AD-A101 106/3 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Graphic Tutorial and Decoding Program for Navy Signal Flags and Pennants.
Master's thesis,
Jay Kent Bien. Mar 81, 50p

This is a highly graphic user-oriented interactive software product which will assist the user to become more proficient at recognizing and employing Navy signal flags, and pennants which are used for visual communications between naval vessels of all types. A tutorial portion of the program has been designed with a number of options, thereby allowing a user to tailor a recognition program to satisfy specific learning requirements. The program is also capable of graphically disolaying any grouping of flags and pennants chosen by the user in flaghoist order. When the flags and pennants are arranged in accordance with the procedural doctrine set forth in the ALLIED MARITIME TACTICAL SIGNAL BOOK, ATP 1(B), Volume II, the program demonstrates the capability of decoding the displayed signal into its predetermined meaning. The current program is resident in the Secure Command, Control and Communications Exercise Laboratory (C3 Lab) at the Navy Postgraduate School. (Author)

AD-A101 107/1 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Command Center Network: Scope and Applications.
Master's thesis,
George Kendall Hamilton, Jr. Mar 81, 82p

The Command Center Network (CCN) is a computer network designed to interconnect a diverse group of heterogeneous shipboard information and Command and Control (C2) subsystems. This local network will utilize a single, high-speed data bus installed on the individual platform. As this network is envisioned, such subsystems as NTDS, NAVMACS, CCIS, SSES, TSA, CV-TSC, and CV-IC will be interconnected in order to correlate infor-

mation to provide the best possible decision base for the commander. The Tactical Flag Command Center (TFCC) concept, which the CCN is essentially designed to support, is considered by the navy as the nerve center of future Command and Control. The CCN is envisioned to be the backbone of the TFCC. This thesis examines the system development of the CCN. (Author)

AD-B046 390/1 PC **A02**/MF **A01**
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
Modular C3 Interface Analysis (Flexible Intraconnect). Volume I. Executive Summary.
Final technical rept. Oct 77-Jul 79,
Carl Schalbe, James Powers, Ben Chi, and Greg Mayhew. Mar 80, 22p HAC-FR79-16-244R-VOL-1, RADC-TR-80-26-VOL-1
Contract F19628-77-C-0261
See also Volume 2, AD-B046 391L.
Distribution limitation now removed.

This report documents the results of the concept definition phase for a high capacity wideband general purpose data/communications bussing system. A 'Flexible Intraconnect' bus concept is described in terms of its use to achieve physical and functional modularity in the design, implementation and operational deployment of command and control (C2) centers of the Tactical Air Force (TAF). Flexible Intraconnect (FI) design parameters are established in terms of traffic loading estimates and requirements of evolving configurations of C2 centers of the TAF. Surveys of data distribution system architectures, current and developing technologies and C2 device interfaces are provided. A design of a Flexible Intraconnect having high data rate and capacity, positive flow control and configuration flexibility is documented. A standardized interface for physical and functional device to bus access is described. Descriptions of the major functional elements of the FI are provided along with top level block diagrams. The design was analyzed and preliminary estimates of error performance, reliability, capacity and response times were derived. Results obtained from this phase will be used in specifications for the subsequent development phase of the FI program. (Author)

AD-B046 391/9 PC **A11**/MF **A01**
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
Modular C3 Interface Analysis (Flexible Intraconnect). Volume II. Study Methodology and Results.
Final technical rept. Oct 77-Jul 79,
Carl Schalbe, James Powers, Ben Chi, and Greg Mayhew. Mar 80, 238p HAC-FR79-16-244R-VOL-2, RADC-TR-80-26-VOL-2
Contract F19628-77-C-0261
See also Volume 1, AD-B046 390L.
Distribution limitation now removed.

A practical FI design concept which meets Tactical Air Force Modular C3 goals has been developed. It is recommended that the preliminary FI design be demonstrated and evaluated in a development program which connects typical C3 devices into an operational configuration. Conclusions: The developed FI concept meets TAF MOD C3 goals, A MOD C3 Standard Interface is defined which promotes C3 interoperability; and The preliminary design exploits advanced technology and is ready to be implemented. Recommendation: Develop the Flexible Intraconnect hardware and software to provide a vehicle for demonstrating and evaluating the concept in a realistic TAF C3 environment.

AD-B049 382/5 PC **A18**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Modular C3 Interface Analysis (Flexible Intraconnect). Volume I, Part 1.
Final technical rept. Oct 77-Jul 79,
William G. Bedsole, Denmer Baxter, William F. Kamsler, James Billars, and James Burrill. Apr 80, 402p MCR-79-1411-VOL-1-PT-1, RADC-TR-80-125-VOL-1-PT-1
Contract F19628-77-C-0262
See also Volume 1, Part 2, AD-B049 383L.
Distribution limitation now removed.

This report documents the preliminary design for a high capacity wide-band general purpose data/communications busing system. The bus, called a 'Flexible Intraconnect,' (FI) will be used to achieve modularity in the design, implementation and deployment of command, control and communications (C3) centers of the Tactical Air Force (TAF). FI design requirements were established by estimates of traffic loads for current and future (through 1980) configurations of Tactical Air Control System (TACS) C3 centers of the TAF. Surveys of data distribution system architectures, current and developing technologies, and device interfaces are provided. A design of a Flexible Intraconnect having high transmission rate and capacity, positive flow control and configuration flexibility is described. A standardized interface for physical and functional device to bus access is described. Description of the major functional elements of the FI are provided along with top level block diagnosis. The design was analyzed and preliminary estimates of error performance, reliability, capacity and response times were developed.

AD-B049 383/3 PC **A05**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Modular C3 Interface Analysis (Flexible Intraconnect) Volume I, Part 2. Appendix D. Information throughout Analysis. Addendum.
Final technical rept. Oct 77-Jul 79,
William G. Bedsole, and William F. Kamsler. Apr 80, 87p MCR-79-1411-VOL-1-PT-2, RADC-TR-80-125-VOL-1-PT-2
Contract F19628-77-C-0262
See also Volume 3, AD-B049 384L.
Distribution limitation now removed.

The objectives of this analysis are to: (1) Determine the information throughput of the flexible intraconnect in terms of blocks per second and megabits per second, and (2) Determine the system response time, probability of block delay, and probability of blockage. These determinations are to be made as a function of a given set of ten scenarios, intraconnect design conditions, and other general conditions.

AD-B049 384/1 PC **A02**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Modular C3 Interface Analysis (Flexible Intraconnect). Volume 3. Executive Summary.
Final technical rept. Oct 77-Jul 79,
William G. Bedsole, Denmer Baxter, William F. Kamsler, James Billars, and James Burrill. Apr 80, 23p MCR-79-1411-VOL-3, RADC-TR-80-125-VOL-3
Contract F19628-77-C-0262
See also Volume 1, Part 1, AD-B049 382L.
Distribution limitation now removed.

This summary highlights the key elements and conclusions reached during Modular C3 Interface Analyses performed on a study contract to define a Flexible Intraconnect capability for tactical command, control, and communications (C3) Systems. A Flexible Intraconnect (FI) is defined as a common transmission capability that may be accessed by all communications and automatic data processing devices within a tactical air force command and control center.

N81-26315/4 PC **A06**/MF **A01**
Hughes Aircraft Co., El Segundo, CA.
The 30/20 Gigahertz Transponder Study.
Final Report.
Dec 80, 114p NASA-CR-165295
Contract NAS3-21508

Design features and performance parameters are described for three types of wideband multiple channel satellite transponders for use in a 30/20 GHz communications satellite, which provides high data rate trunking service to ten ground station terminals. The three types of transponder are frequency division multiplex (FDM), time division multiplex (TDM), and a hybrid transponder using a combination of FDM and TDM techniques. The wideband multiple beam trunking concept, the traffic distribution between the trunking terminals, and system design constraints are discussed. The receiver front end design, the frequency conversion scheme, and the local oscillator design are described including the thermal interface between the transponders and the satellite. The three designs are compared with regard to performance, weight, power, cost and initial technology. Simplified block diagrams of the baseline transponder designs are included.

N81-26317/0 PC **A04**/MF **A01**
Hughes Aircraft Co., Torrance, CA. Electron Dynamics Div.
A 12 Ghz Satellite Video Receiver: Low Noise, Low Cost Prototype Model for TV Reception from Broadcast Satellites.
Final Report, Jan. 1978 - Feb. 1979.
M. A. Hreha, J. G. Baprawski, C. N. Chamaneria, S. J. Ferry, and G. Keithly. Dec 78, 72p NASA-CR-160019, W-42953
Contract NAS5-24421

A 12-channel synchronous phase lock video receiver consisting of an outdoor downconverter unit and an indoor demodulator unit was developed to provide both low noise performance and low cost in production quantities of 1000 units. The prototype receiver can be mass produced at a cost under $1540 without sacrificing system performance. The receiver also has the capability of selecting any of the twelve assigned satellite broadcast channels in the frequency range 11.7 to 12.2 GHz.

N81-26318/8 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Contributions to the Colloquium on High Frequency Technology in Aerospace Research.
Jun 80, 118p DFVLR-MITT-80-10
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-704). Colloquium Held at Oberpfaffenhofen, West Germany, 23 Jun. 1980.

No abstract available.

N81-26327/9 PC **A05**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Effects of the Lower Atmosphere on Radio Propagation at Frequencies Above 1GHZ.
1980, 95p FUB-22-1980
Presented at U.R.S.I. Symp., Lennoxville, Canada, 26-30 May 1980.

No abstract available.

PB81-214363 PC **A04**/MF **A01**
GAI-Tronics Corp., Reading, PA.
Improved Hardware for Trolley Wire Phone Systems.
Open file rept. (Final) 30 Sep 76-30 Jun 78,
Joseph L. Harley, Jr. Mar 79, 55p BUMINES-OFR-49-81
Contract H0166144

This report presents the investigation and engineering of state-of-the-art trolley wire phone hardware. The various problem areas of trolley wire communication systems are discussed with the objective of improving circuit performance to compensate for the poor transmission characteristics of the line. Relatively inexpensive hardware designed for this purpose is detailed and documented.

PB81-214496 PC **A14**/MF **A01**
Advanced Level Telecommunication Training Centre, Ghaziabad (India).
Seminar on National Subscriber Dialling Held at New Delhi, India on 13-17 February 1979.
K. H. Rosenbrock, K. Weissbacker, P. Plehiers, B. H. Shanta, and P. S. Saran. 1980. 310p

Contents:
- Some basic requirements to be met by subscriber trunk dialling;
- Network structure, routing and national numbering plans;
- Charging and billing in telephone networks;
- Indian network:
- National charging plan;
- Indian network:
- National transmission plan;
- Indian network:
- National numbering, switching, and routing plan;
- Indian network:

Trunk exchange planning in Delhi;
The present electromechanical system of the Deutsche Bundespost;
International subscriber trunk dialling in Germany;
U.K. post office;
experience in introducing STD;
SPC switching principles;
Introduction of SPC switching system into national telecommunications networks;
Operation and Maintenance staff for SPC exchange;
Signalling in national telephony networks;
Introduction to common channel signalling system No. 6;
Interworking between signalling systems;
Automatic signalling tests;
Signalling on satellite links.

PB81-215873 Not available NTIS
National Bureau of Standards, Washington, DC.
Perspective on Trends in Electronic Communication.
Final rept.,
I. W. Cotton. 1980, 12p
Proceedings of AAAS Selected Symp. 52, held in Houston, Texas on January 3-8, 1979.
Pub. in Paper in Electronic Communication: Technology and Impacts, p7-18 1980.

This review and perspective will concentrate on the area of electronic data communications, where major technological advances have been made in the past ten or fifteen years. Not only technological changes but relevant regulatory concerns are of interest to us, and will be covered here. Their impact on users will also be summarized.

PB81-216954 PC **A08**/MF **A01**
Advanced Level Telecommunication Training Centre, Ghaziabad (India).
Seminar on Stored Program Control Held on August 22-31, 1977. Volume II.
1977, 159p

The report contains seminar papers on the Stored Program Control system (SPC). Among the system's aspects discussed are software production and maintenance, the upgrading existing exchange by the use of mini- and micro-processors and the training of personnel for SPC exchanges.

PB81-217127 PC **A03**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Guidelines to Telecommunications Interconnection Requirements for Message Input to the USPS (United States Postal Service) E-COM (Electronic Computer Originated Mail) System,
D. V. Glen. Apr 81, 46p NTIA-REPORT-81-73
Sponsored in part by Postal Service, Rockville, MD. Research and Development Dept.

Guidelines for interconnection to the United States Postal Service (USPS) Electronic Computer Originated Mail (E-COM) System via telecommunications carriers are developed. A description of the E-COM System is given and the need for telecommunications standards for accessing the E-COM System is provided.

PB81-218455 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Review of Literature, Applicable Test Methods, and Incident Data for the Evaluation of the Fire Performance of Central Telephone Office Equipment.
Final rept.,
Emil Braun. May 81, 42p NBSIR-81-2261

At the request of the Rural Electrification Administration, a program was initiated to evaluate the adequacy of current flammability specifications for electrical equipment used in telephone company central offices. The high reliance on telephone services for emergency communications necessitates that measures be considered to minimize the likelihood of fire related interruptions of service. This report provides a review of current test methods and specifications for central office equipment; a review of available fire test methods in various categories; a brief literature review of relevant fire research and fire testing of wiring, cables, and assemblies; and a review of fire incident data.

SAND-81-0691C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
SNLA Terminal Switching Network.
M. O. Vahle, L. F. Tolendino, and M. D. Thompson. 1981, 6p CONF-810623-2
Contract AC04-76DP00789
24. midwest symposium on circuits and systems, Albuquerque, NM, USA, 29 Jun 1981.

The rapidly growing number of interactive terminals at Sandia National Laboratories must compete for a limited number of computer ports. In addition, interactive computer users require access to several host systems. To meet these needs a terminal switching network was designed which utulizes circuit switching techniques to provide port contention and multiple host access. (ERA citation 06:022976)

17D. Electromagnetic and Acoustic Countermeasures

AD-A100 669/1 PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Magnetically Undetectable Electronic Circuit Assemblies,
Hayden Morris. 3 Oct 80, 28p Rept no. NSWC/TR-80-441

This report describes the results of work concerned with fabricating, electronic circuit assemblies which are undetectable magnetically, and contains recommendations concerning further development work. (Author)

AD-A100 764/0 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Frequency Domain Measurements of Microwave Absorber Design Materials.
Master's thesis,
Donald G. Aguirre. Dec 80, 165p Rept no. AFIT/GE/EE/80D-8

Using frequency domain techniques, a system was developed to measure the complex permittivity and permeability of different materials in the Ku band (12.4 to 18 GHz). A sample of fiberglass, teflon, FGM-40, and two different plexiglas configurations were chosen for this experiment. The newly developed measuring system consisted of a two horizontal-plane sectoral horn and a sample holder assembly. A 9.5 x 0.8 cm piece of the sample material was cut and fitted into the sample holder assembly. The reflection and transmission coefficients for the sample were measured, using a network analyzer and frequency synthesizer as the swept frequency signal source. A dedicated computer calculated the complex permittivity and permeability and plotted the output data. The two configurations of plexiglas and the fiberglass sample were tested ten times to obtain a statistical representation of the results. The permittivity and permeability obtained for the selected samples using the frequency domain measurement technique were compared with the results obtained in a previously developed system which used time domain techniques. The data comparison between the two systems was good for teflon, plexiglas, and fiberglass in the frequency range from 12.4 to 16 GHz. Some variations were noted for the FGM-40. Since the results obtained were generally consistent between both techniques, it is claimed that the newly implemented frequency domain system is a viable alternative for the rapid measurement of intrinsic properties in the Ku band.

AD-A100 779/8 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Polarization Responsive System for Microwaves.
Master's thesis,
Warren R. Minnick. Dec 80, 103p Rept no. AFIT/GE/EE/80D-32

Responsive polarization methods and concepts were studied in terms of general system requirements. A primary goal was fast response. Matrix methods were found appropriate for describing the polarization states and modifications thereto. A 9.3 GHz experiment, of one promising concept, was constructed. Stokes parameters were measured, modified and converted to Jones parameters for response. Basic feasibility was established for the hybrid Tee circuit arrangement which was developed for the thesis experiment. The results were as predicted by theory. (Author)

AD-A100 795/4 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Error-correcting Code Performance in a Modeled ECM Environment.
Master's thesis,
Dennis James Rensel. Dec 80, 145p Rept no. AFIT/GE/EE/80D-37

Electronic countermeasures (ECM), such as broadband, switched broadband, continuous wave and multitone jamming, are designed to disrupt communication systems. The subject of this thesis is the effect of these ECM on the performance of error correcting codes in an additive Gaussian noise channel. The channel is modeled with two convolutional coders having a rate of 1/2 and constraint lengths of 2 and 6, an 8-ary FSK modulator and demodulator, and a decoder based upon the Viterbi algorithm. Two measures of effectiveness are the probability of bit errors P(b)(e) for the waveform channel and the bit error rate (BER) for the overall channel performance. It is shown that both P(b)(e) and BER are increased by the previously mentioned ECM. To aid in evaluating the performance of these coders, a simulation program was written. In the program, the transmission signal, the channel noise, and the jamming signal are independent of each other. the basic conclusions for these two convolutional codes are that the dual-three encoder with the longer codeword performs better in the no jamming or in a Gaussian jamming environment, while the CC1 encoder with the shorter codeword performs better in a CW jamming environment. (Author)

AD-A100 886/1 PC **A04**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Characterization of Aerosol Nonlinear Effects on a High Power CO2 Laser Beam.
Final rept.,
C. W. Bruce, Y. P. Yee, and S. J. Duran. Feb 81, 73p Rept no. ERADCOM/ASL-TR-0074

This report describes a set of aerosol measurements to determine the effect of a countermeasure smoke, white phosphorus (WP), on a pulsed high-energy laser (HEL) beam. An analysis of the aerosol (gaseous and particulate airborne material) was used as the basis for calculations of evaporative clearing, and application was made to a given specific test situation. Linear propagation properties forming the basis for the 10.6 micrometers pulsed laser nonlinear effects are obtained relatively directly by using spectrophone absorption and extinction, a light scattering particle spectrometer and nephelometers (particle density as a function of radius and mass loading), and dew-point hygrometer (partial pressure of water vapor). General conclusions are that, for the smoke produced by burning WP, a CO2 pulsed HEL beam clears the optical path quite rapidly and efficiently. The absorption after clearing is caused by the residual vapors and is much lower. (Author)

17E. Infrared and Ultraviolet Detection

AD-A101 025/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Avalanche Multiplication and Noise Characteristics of Low-Dark-Current GaInAsP/InP Avalanche Photodetectors.
Journal article,
Vicky Diadiuk, Steven H. Groves, and Charles E. Hurwitz. 14 Jul 80, 5p JA-5120, ESD-TR-81-36
Contract F19628-80-C-0002

Pub. in Applied Physics Letters, v37 n9 p807-810, 1 Nov 80.

No abstract available.

AD-A101 152/7 PC **A05**/MF **A01**
Aerospace Corp., El Segundo, CA. Chemistry and Physics Lab.
Helium Purge Flow Prevention of Atmospheric Contamination of the Cryogenically Cooled Optics of Orbiting Infrared Telescopes: Calculation of He-O Differential Cross Section,
Nancy m. Harvey, and Ronald R. Herm. 5 Jun 81, 86p TR-0081(6432-03)-1, SD-TR-81-53
Contract F04701-80-C-0081

The ability of an He purge gas to protect the cryogenically cooled optics of orbiting infrared telescopes from the primary atmospheric contaminant, atomic oxygen, can be estimated by Monte Carlo calculations simulating the He-O scattering events that would occur in the operating telescope. We report the results of accurate quantum mechanical calculations of the He-O differential cross sections sigma(theta, E) needed in such Monte Carlo calculations. To facilitate the use of these cross sections in Monte Carlo calculations, we have constructed a simple separable function of E and theta which provides an adequate representation of sigma(theta, E) for the entire range of relative collision energies studied, E = 0.02 to 1.66 eV. For high relative collision energies, we have also tested the accuracy of the computationally simpler WKB approximation. (Author)

17F. Magnetic Detection

PAT-APPL-6-223 635 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Magnetostrictive Optical Fiber Cable and Magnetic Field Detector, and Method thereof.
Patent Application,
Ammon Nariv, and Harry V. Winsor. Filed 12 Jan 81, 17p AD-D008 542/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An optical fiber cable and magnetic field detector magnetostrictively reactive to the presence of an external magnetic field is presented. The optical fiber cable comprises a elongated optically transparent core sheathed by a magnetostrictively responsive jacket disposed about the periphery of the core. The jacket responds to magnetic fields present and strains the core effecting the light transmission of the core. The effect upon the light transmission by the jacket is detected by interferometry for determining the presence of the magnetic field. (Author)

17G. Navigation and Guidance

AD-A100 688/1 PC **A02**/MF **A01**
Maryland Univ., College Park. Inst. for Physical Science and Technology.
RF Command and Ranging System for Balloon Flight Applications.
Final rept. 1 Jun 77-31 Oct 80,
T. J. Rosenberg, and F. J. Lebert. 1 May 81, 23p Rept no. BN-967
Contract N00014-77-C-0423
Prepared in cooperation with DACOM Corp., Arnold, MD.

This paper describes a radio frequency (RF) command and ranging system developed to provide the scientific balloon community and other users with a versatile, self-contained system for remote control applications. Emphasis has been placed on limiting the weight, size, and cost of the remote unit in order to make the system economical in applications where recovery is not practical. The design incorporates several unique features which allow for expanding the degree of sophistication obtainable in balloon command and control. Upon command, the base station transmits a self-clocking, pulse code modulated signal and receives a status signal reply from the remote unit. The base station and remote unit operate in simplex mode utilizing the same carrier frequency for both transmission and reception. The system provides slant range accurate of + or - 3 nautical miles, command and status of 15 independent channels, and flight termination control. Successful flight tests have been performed in New Mexico and Antarctica. (Author)

AD-A100 825/9 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Sensitivity Study of Strapdown Inertial Sensors in High Performance Applications.
Master's thesis,
John E. Ryan. Dec 80, 225p Rept no. AFIT/GE/EE/80D-38

This study uses a computer simulation of a strapdown laser gyro inertial reference system to analyze the errors generated as a result of highly dynamic flight profiles. A stochastic error model using state-of-the-art inertial sensors is developed in detail and implemented in software. SOFE, a generalized simulation program, was used to implement both a Monte Carlo simulation and a covariance analysis. The Monte Carlo method was selected to perform the error analysis. Two highly dynamic flight trajectories were developed using the flight profile generator, PROFGEN. The PROFGEN program itself was modified to include an aircraft roll time constant and a roll-only maneuver. The errors generated in the inertial reference system as a result of these flight trajectories were investigated. Both an error budget and an analysis of the maneuvers inducing these errors were accomplished. Gyro error sources induced the most system error and coupled the dynamics of the flight trajectory into the variations of the error. Misalignment was found to be the major cause of both the accelerometer and gyro induced error. Successive maneuvers were found that reinforced system errors and other maneuvers were found that cancelled these errors. Also, some cases were found where the amount of system error varied with a change in heading. (Author)

AD-A100 835/8 PC **A02**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Worldwide OMEGA and Very Low Frequency (VLF) Transmitter Outages, January to December 1980.
Data rept. Jan-Dec 80,
Lorraine Rzonca. May 81, 24p FAA-CT-81-26, FAA-RD-81-29

An investigation of worldwide OMEGA and very low frequency (VLF) transmitter outages during 1980 was conducted with emphasis on simultaneous outages. Data includes frequency and duration of simultaneous outages and total yearly percentage shutdown for each transmitter. Scheduled outages are specifically noted. The most significant dual OMEGA outage lasted 4.9 hours when the Argentina transmitter was shutdown to correct tower structural problems while La Reunion was down for annual maintenance. (Author)

AD-A100 836/6 PC **A06**/MF **A01**
National Aeronautical Establishment, Ottawa (Ontario).
A Kalman Filter Approach to Navigation on the NAE Convair 580 Aeromagnetics Research Aircraft (L'Apport du Filtre Kalman Dans le Systeme de Navigation de L'Aeronef de Recherche Aeromagnetique nae Convair 580),
B. W. Leach. Feb 81, 111p NAE-LR-604, NRC-19271
Abstract in French.

Doppler radar, compass heading, and VLF communications station phase difference information are combined in an optimal fashion to form an ten-state Doppler/VLF Kalman filter navigation algorithm is designed for use onboard the NAE Convair 580 aeromagnetics research aircraft, with simulation studies conducted using computer programs written in FORTRAN for the IBM 3032 TSS operating environment. Results from the studies show the unique features of a Kalman filtering approach to the navigation task. Various contingencies, or anomalous situations, that can arise when handling the VLF data are considered, and solutions are offered in the context of the Kalman filter approach being used. A comparison study involving simulated navigation data demonstrates the superiority of the Kalman filter navigator compared to simpler navigation algorithms, especially when significant bias errors occur in the basic quantities being measured. A further comparison study based on navigation data collected onboard the Convair verifies that the proposed Kalman filter navigation algorithm operates properly when using typical 'real world' data. (Author)

AD-A101 079/2 PC **A05**/MF **A01**
Stanford Univ., CA. Dept. of Aeronautics and Astronautics.
Modeling a Cryogenic HE3 Nuclear Gyro.
Interim rept.,
Gerald L. Shaw. Dec 80, 90p SUDAAR-525, AFOSR-TR-81-0523
Contract F49620-78-C-0088

Over the last two decades, several nonconventional gyro schemes have been proposed. Directed primarily at eliminating the bearing problems in conventional mechanical gyros, it was anticipated that either better performance could be achieved or performance comparable to conventional gyros could be achieved at a lower cost. No attempt is made here to compare or contrast all of these various schemes, but rather to look at certain aspects of a particular device, a cryogenic He3 nuclear gyro, and to provide models for estimating its performance. The nuclear gyro is highly dependent upon the stability and homogeneity of the magnetic field environment. A combination of low temperature physics technologies makes such a device practical. By generating the applied field with superconducting coils the stability of the field is guaranteed by the inherent stability of the persistent super-currents in these coils. Then protection from a changing external environment is provided by enclosing the device within a superconducting shield. Nevertheless, even in an ideal magnetic field environment, the nuclear gyro is subject to various rectification mechanisms. Of particular interest is the role kinematic rectification plays in this device. Rectification mechanisms are discussed, and mathematical models derived for calculating the methods of kinematic rectification drift. An experiment designed to measure and distinguish the kinematic rectification effects are discussed. The effects of thermal gradients and accelerations in the presence of an inhomogeneous magnetic field are also discussed, and models derived from which their magnitudes are calculated. (Author)

AD-A101 162/6 PC **A09**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Navy Navigation Satellite Program 1958-1979. Journal Articles and Unlimited Distribution Reports.
Report bibliography.
Jan 80, 199p Rept no. JHU/APL/SR-80-3
Contract N00024-78-C-5384

The Bibliography on the Navy Navigation Satellite Program (NNSP) covers the years 1958 through 1979 and consists of citations (with abstracts) on the following topics: the Navy Navigation Satellite System (NNSS), NNSS subsystems, experimental and engineering satellites in the NNSP development effort, and uses of the NNSS including non-navigation applications. The arrangement of entries is by year of publication and within each year alphabetically by author. Author and key word indexes are included. (Author)

N81-26156/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Wallops Island, VA. Wallops Station.
Development and Evaluation of a Prototype In-Flight Instrument Flight Rules (IFR) Procedures Trainer.
Final Report.
J. B. Aaron, Jr., and G. G. Morris. Jun 81, 34p NASA-TM-73292

An in-flight instrument flight rules (IFR) procedures trainer capable of providing simulated indications of instrument flight in a typical general aviation aircraft independent of ground based navigation aids

was developed. The IFR navaid related instruments and circuits from an ATC 610J table top simulator were installed in a Cessna 172 aircraft and connected to its electrical power and pitot static systems. The benefits expected from this hybridization concept include increased safety by reducing the number of general aviation aircraft conducting IFR training flights in congested terminal areas, and reduced fuel use and instruction costs by lessening the need to fly to and from navaid equipped airports and by increased efficiency of the required in-flight training. Technical feasibility was demonstrated and the operational feasibility of the concept was evaluated. Results indicated that the in-flight simulator is an effective training device for teaching IFR procedural skills.

N81-26169/5 PC **A05**/MF **A01**
LinCom Corp., Pasadena, CA.
Orbiter Global Positioning System Design and Ku-Band Problems Investigation, Exhibit B, Revision 1.
Interim Report.
C. M. Chie, and W. R. Braun. May 81, 93p
NASA-CR-161009, TR-0581-0980
Contract NAS9-16097

The LinCom effort in supporting the JSC study of the use of the Global Positioning System (GPS) on the space shuttle and in Ku-band problem investigation is documented. LinCom was tasked to evaluate system implementation, performance, and integration aspects of the shuttle GPS and to provide independent technical assessment of reports submitted to JSC regarding integration studies, system studies and navigation analyses.

PAT-APPL-6-255 030 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
GPS/Doppler Sensor Velocity Derived Attitude Reference System.
Patent Application,
Jack Gray. Filed 17 Apr 81, 16p AD-D008 536/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An accurate and constantly updated attitude instrument is provided for aircraft. The pitch and roll angles are calculated from two sets of velocity measurements, one set being derived from signals received from orbiting navigational satellites and the other set from on-board equipment which determines the aircraft's axial velocities. The on-board equipment may be a Doppler groundspeed sensor or an inertial system using accelerometers, the outputs of which are integrated to derive the axial velocities. (Author)

PB81-807067 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Discrete Address Beacon System. 1964-May, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-May 81.
Jul 81, 184p
Supersedes PB80-807522, and NTIS/PS-79/0244.

The development of the Discrete Address Beacon System is treated in these Federally-sponsored research reports. Topics include the data link, message formats, antenna systems, signal propagation, transponders, and interface with the Air Traffic Control Radar Beacon System. (This updated bibliography contains 177 citations, 23 of which are new entries to the previous edition.)

17H. Optical Detection

AD-A100 821/8 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Optical Phase Estimation from Integrated Samples of the Heterodyned Wavefront.
Master's thesis,
Martin B. Mark. Dec 80, 87p Rept no. AFIT/GEO/EE/80D-3

A method for using integrating detectors to estimate the phase of an optical wavefront is investigated. The phase and amplitude are assumed to vary slowly compared to the integration time and the integrated samples are shown to be corrupted by white gaussian noise. A maximum a-posteriori nonlinear Kalman filter is derived and simulated for both constant and random walk phase processes. The performance of the filter is compared to its Cramer-Rao lower bound and a first order linearized phase-locked loop (PLL). The filter never performs a great deal better than the PLL, but it can be implemented in a low bandwidth system whereas the PLL assumes a wideband system. The local oscillator is initially assumed to be stabilized in frequency and amplitude, and later a frequency shift is introduced. The filter manages to acquire and track the phase in a high carrier-to-noise ratio (CNR) environment although it does not estimate the frequency shift well. At 30 db CNR, the phase is estimated within about 0.02 radians, whereas the frequency shift estimation error is on the order of 500 kHz for frequecy shift of 2MHz. (Author)

AD-A100 870/5 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Adaptive Laser Pointing and Tracking Problem.
Master's thesis,
James Singletery, Jr. Dec 80, 112p Rept no. AFIT/GEO/EE/80D-12
Availability: Microfiche copies only.

The digital implementation of a negating phase shift that operates perfectly under ideal conditions was a major accomplishment. The establishment of a zero level of 10 to the -8th power was also significant. The incorporation of the exponential smoothing technique to minimize the effect of measurement noise was important since it uncovered a possible connection between the size of the target image and its performance throughout the pattern recognition process. However, the major obstacle that surface during the execution of this project was a filter divergence problem. It has been proposed that this problem can be solved by implementing the Fourier transform derivative property instead of the forward-backward difference method to compute the spatial derivative of the non-linear h function.

AD-A101 149/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Submillimeter-Wave Properties of Thermospheric Rocket Plumes.
Journal article,
Marvin M. Litvak, Jerald A. Weiss, and Gerald F. Dionne. 26 Apr 80, 20p JA-5101, ESD-TR-81-32
Contract F19628-80-C-0002
Pub. in International Jnl. of Infrared and Millimeter Waves, v1 n4 p561-579 1980.

No abstract available.

N81-26529/0 PC **A03**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
Finding the Times That SMMR Observed a Ship.
Final Report.
9 Jul 79, 46p NASA-CR-159998, R-SAR-79-01
Contract NAS5-25072

In order to facilitate the coincidence calculations, the coordinates of the ship and the satellite were transformed to the ECO system in which the equatorial plane is the plane of the satellite's orbit. The transformation matrices for each step are presented. The ship could be observed when it was in a band about the equator in the ECO system. The width of the band was determined by the scan pattern of the instrument.

17I. Radar Detection

AD-A100 665/9 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Radar Beacon Transponder (RBX) Functional Description.
Project rept.,
Ronald G. Sandholm. 18 Feb 81, 31p ATC-104, FAA-RD-80-135
Contracts F19628-80-C-0002, DOT-FA77WAI-817

The Radar Beacon Transponder (RBX) is a ground-based transponder used to control the threat detection sensitivity level of BCAS aircraft operating in high density terminal airspace. The RBX is also used to deliver displayed resolution advisories from BCAS to the ATC facility. The normal DABS interrogation waveforms and message formats are used for communication between the RBX and BCAS aircraft. The appropriate BCAS sensitivity level is selected by comparing the BCAS aircraft position with an internally stored sensitivity level map of the surrounding airspace volume. This document provides a functional description of the RBX and shows that reliable performance is achievable in the presence ofinterference from ATCRBS and BCAS air-to-air interrogations. (Author)

AD-A100 666/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Radar Beacon Transponder (RBX) Installation and Siting Criteria.
Project rept.,
Ronald G. Sandholm. 13 Mar 81, 21p ATC-106, FAA-RD-81-10
Contracts F19628-80-C-0002, DOT-FA77WAI-817

The Radar Beacon Transponder (RBX) is a ground-based facility used in conjunction with other elements of the Active Beacon Collision Avoidance System (BCAS) to control the threat detection sensitivity level of BCAS aircraft and to convey displayed Resolution Advisories from the BCAS aircraft to the local ATC terminal facility. This paper describes the mechanisms of specular multipath reflection and signal shadowing, and discusses their impact on the RBX link power budget. Criteria for choice of RBX antenna height and location are presented. (Author)

AD-A101 143/6 PC **A13**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Multiple Arrested Synthetic Aperture Radar.
Doctoral thesis,
Jerrold s. Shuster. May 81, 298p Rept no. AFIT/DS/EE/81-1

This report contains the formulation and analysis of an airborne synthetic aperture rate scheme which employs a multiplicity of antennas with the displaced phase center antenna technique to detect slowly moving targets embedded in a severe clutter environment. The radar is evaluated using the target to clutter power ratio as the measure of performance. Noise is ignored in the analysis. An optimization scheme which maximizes this ratio is employed to obtain the optimum processor weighting. The performance of the MASAR processor with optimum weights is compared against that using target weights (composed of the target signal) and that using binomial weights (which, effectively, form an n-pulse canceller). Both the target and the clutter are modeled with the electric field backscattering coefficient. The target is modeled simply as a deterministically moving point scatterer with the same albedo as a point of clutter. The clutter is modeled as a homogeneous, isotropic, two-dimensional, spatiotemporal random field for which only the correlation properties are required. The analysis shows that this radar, with its optimum weighting scheme, is a promising synthetic aperture concept for the detection of slowly moving targets immersed in strong clutter environments. (Author)

AD-A101 156/8 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
ASDE-3 Antenna Development and Test.
Final rept. Jan 80-Apr 81,
Apr 81, 72p TSC-FAA-81-10, FAA-RD-81-43

The ASDE-3 radar antenna was developed so that closely spaced targets on an airport surface could be resolved. The requirement of accurately detecting targets as close as 500 feet from the antenna necessitated some type of near field focussing. A variable focus, shaped beam, doubly curved reflector was designed and successfully tested for

this application. Additional features included an integrated rotating radome and circular polarization. Representative azimuth and elevation patterns are presented. During the development, a method for taking and plotting radiation patterns of the antenna scanning at its operational rotation rate was devised and is described. (Author)

PAT-APPL-6-258 346 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Radar Clutter Reduction by Use of Frequency-Diverse, Wideband Pulse-Compression Waveforms.
Patent Application,
Samuel J. Caprio. Filed 24 Apr 81, 19p AD-D008 548/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is given for generating and transmitting wideband, expanded radar pulses which spatially decorrelate clutter and are frequency-hopped from pulse to pulse by the proper frequency difference for clutter decorrelation by frequency-diversity. The returned signals are compressed, delayed by one pulse interval, and correlated, each with its succeeding echo pulse, to decorrelate the clutter returns but not the target echoes. The frequencies of the transmitted pulses are locked to the local oscillator frequency, which is very stable. A double-sideband technique is used to generate the different pulse frequencies. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

DE81022252 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Heavy-Ion-Fusion Half-Year Report. October 1, 1980-March 31, 1981.
Apr 81, 40p LBL-12594
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The Cs exp + pulsed drift tube injector has continued to operate satisfactorily in a program of studying the characteristics of the beam and of developing diagnostic tools. A single beam transport experiment has been designed and fabriction of the components has begun. The purpose of the experiment is the study of transverse beam dynamics and the stability of a space-charge dominated beam traveling through a periodic strong-focussing channel. Increasing attention has been given to multiple-beam heavy ion induction linacs and it appears that there will be significant technical and cost advantages in such a system. Theoretical studies of the longitudinal stability of beams and of longitudinal-transverse coupling have continued. Electrostatic quadrupole beam transport systems have also been an object of study. Engineering development of module components has included experiments with novel ignitrons as well as evaluations of standard ones. Evaluation of magnetic core material also continues. (ERA citation 06:024584)

DOE/ET/53018-2 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park.
Design of Magnetic Mirrors for a Linear theta Pinch.
V. P. Veglia. Jan 81, 112p
Contract AS02-76ET53018

The problem of generating optimum magnetic mirror fields at the ends of a 50-cm long theta-pinch experiment to study particle flow and loss effects has been investigated. A combination of active and passive mirrors was developed to produce 2-3:1 fields for a 23-kG pinch. Biot-Savart and potential field prediction solutions for the magnetic field distribution were compared with experimental measurements in 2-5-cm long coils for the 50-cm long pinch. (ERA citation 06:024581)

PB81-864308 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Elmo Bumpy Torus Reactors. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 98p
Sponsored in Part by National Technical Information Service, Springfield, VA.

Citations in this bibliography cover theoretical and experimental physics, modeling, computations, and engineering and design aspects of Elmo Bumpy Torus (EBT) reactors. Some attention is also given to EBT operation and performance. (Contains 104 citations fully indexed and including a title list.)

PPPL-1784 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Banana Drift Transport in Tokamaks with Ripple.
R. Linsker, and A. H. Boozer. Apr 81, 24p
Contract AM02-76CH03073

Ripple transport in tokamaks is discussed for the banana drift collisionality regime, which lies below the ripple plateau regime treated earlier. The physical mechanisms that dominate banana drift transport are found to differ from those considered in previous work on this regime, and the resulting transport coefficients can consequently differ by several orders of magnitude. (ERA citation 06:024565)

PPPL-1792 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Toroidal Plasma Rotation in the PLT Tokamak with Neutral-Beam Injection.
S. Suckewer, H. P. Eubank, R. J. Goldston, J. McEnerney, and N. R. Sauthoff. Apr 81, 34p
Contract AM02-76CH03073

Toroidal plasma rotation in the Princeton Large Torus, PLT, has been measured for various plasma and neutral beam injection conditions. Measurements of the plasma rotational velocities were made from Doppler shifts of appropriate spectral lines and include data from both hydrogen and deuterium beams and co- and counter-injection at several electron densities. Without injection, a small but consistent toroidal rotation exists in a direction opposite to the plasma current (counter-direction) in the plasma center but parallel to the current (co-direction) in the plasma periphery. Using these measured velocities and the plasma density and temperature gradients, radial electron fields can be determined from theory, giving E/sub r / approx. = 40 V/cm near the plasma center and E/sub r/ approx. = 10 V/cm near the plasma edge. Insertion of a local, 2.5 percent magnetic well produced no observable effect on the beam driven rotation. Modeling of the time evolution and radial distribution of the rotation allows one to deduce an effective viscosity of the order of (1 to 5) x 10 exp 4 cm exp 2 /sec. (ERA citation 06:022886)

PPPL-1795 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Minimization of Magnetic Field-Ripple in Toroidal-Confinement Geometries.
H. P. Furth, and C. Ludescher. Apr 81, 11p
Contract AM02-76CH03073
Q.

A critical optimization problem in the design of toroidal fusion reactors is the minimization of magnetic field ripple in the presence of fixed requirements for access through the windings of the coil system. The present paper points out a systematic approach to this problem. Toroidal field coils that do not lie in poloidal planes, and particularly coils with non-planar windings, are shown to give optimal results. (ERA citation 06:024585)

PPPL-1796 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Modular Coils: A Promising Toroidal-Reactor-Coil System.
T. K. Chu, H. P. Furth, J. L. Johnson, C. Ludescher, and K. E. Weimer. Apr 81, 30p
Contract AM02-76CH03073

The concept of modular coils originated from a need to find reactor-relevant stellarator windings, but its usefulness can be extended to provide an externally applied, additional rotational transform in tokamaks. Considerations of (1) basic principles of modular coils, (2) types of coils, (3) types of configurations (general, helically symmetric, helically asymmetric, with magnetic well, with magnetic hill), (4) types of rotational transform profile, and (5) structure and origin of ripples are given. These results show that modular coils can offer a wide range of vacuum magnetic field configurations, some of which cannot be obtained with the classical stellarator or torsatron coil configuration. (ERA citation 06:024586)

UCRL-52000-81-6 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Energy and Technology Review.
S. Weissenberger, R. B. Crawford, M. A. Esser, P. L. Lien, and K. Madsen. Jun 81, 32p
Contract W-7405-ENG-48

Some research programs at Lawrence Livermore Laboratory are described. These include performance results from the tandem mirror experiment for thermonuclear reactor design, tandem mirror end plugs for future fusion reactors, and verifying compliance with the test ban treaties. (ERA citation 06:022920)

UCRL-53099 PC **E04**/MF **A01**
Lawrence Livermore National Lab., CA.
VEPEC: A 3D Vector Potential Equilibrium Code for High-beta Minimum-B Plasma Confinement.
D. V. Anderson, J. Breazeal, and C. B. Sharp. 15 Jan 81, 51p
Contract W-7405-ENG-48
Includes 4 sheets of 48x reduction microfiche.

Several applications of plasma equilibrium models require a suitable continuous representation for the magnetic field. For example, numerical generation of single particle orbits in these fields requires that the continuum representation maintain del B = 0 or at least keep it very small. Performing the interpolation analysis in terms of the vector potential, A, guarantees del B = 0 whereas using the magnetic induction, B, does not. The code presented here uses A as the primary dependent variable. A finite element representation employing tricubic splines significantly reduces spatial truncation errors compared to conventional finite difference methods. Some results pertinent to the MFTF-B experiment are presented. Many details about the code are presented on fiche as described in the appendices. (ERA citation 06:022888)

UCRL-85828(Rev.1) PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Ambipolar Potential Formation in TMX.
D. L. Correl, S. L. Allen, and T. A. Casper. 5 May 81, 23p CONF-810511-4(Rev.1)
Contract W-7405-ENG-48
Workshop on potential formation and control in bumpy tori and mirrors, Oak Ridge, TN, USA, 11 May 1981.

TMX experimental data on ambipolar potential control and on the accompanying electrostatic confinement are reported. New results on the radial dependence of the central-cell confining potential are given. Radial and axial particle losses as well as scaling of the central-cell axial confinement are discussed. (ERA citation 06:024568)

UCRL-85912 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.

Study of the Equilibrium and Decay of Compact Toroids Generated by a Magnetized CO-Axial Plasma Gun.
E. H. A. Granneman, G. C. Goldenbaum, J. H. Hammer, C. W. Hartman, and D. S. Prono. 27 Apr 81, 10p CONF-810906-4
Contract W-7405-EN-48
10. European conference on controlled fusion and plasma physics, Moscow, USSR, 14 Sep 1981.

We have continued our earlier work on the co-axial gun production of compact toroidal plasmas that are contained in an oblate shaped cylindrically symmetrical flux conserver. Following our observation that the magnetic structure produced by the gun is well described by force-free currents, the analysis of the data has been extended along the lines of J.B. Taylor's theory of the reversed field pinch. Spatial magnetic field profiles are well represented by the lowest energy eigenmode solution to nabla x vector B = k vector B with k = constant. (ERA citation 06:024592)

18B. Isotopes

K/TL/AT-30P PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Isotopic-Ratio Mass Spectrometers for the Analysis of Uranium Hexafluoride.
C. Sulfridge, and H. C. Jones. 6 May 81, 17p CONF-810548-1
Contract W-7405-ENG-26
29. annual conference on mass spectrometry, Minneapolis, MN, USA, 24 May 1981.

Descriptions, including photographs, are presented of the two isotopic-ratio mass spectrometers which have been developed for the analysis of uranium hexafluoride. The objectives were to have these spectrometers meet the sensitivity and precision requirements of development and improvement programs at uranium enrichment facilities, and for universal application to on-stream monitoring of UF sub 4 in enrichment facilities. (ERA citation 06:023963)

18C. Nuclear Explosions

AD-A100 637/8 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
RADHOT: A Radiation Hydrodynamics Code for Weapon Effects Calculation.
Master's thesis,
Douglas P. Wade. Mar 81, 105p Rept no. AFIT/GNE/PH/81-10

RADHOT is a one - dimensional Lagrangian radiation-hydrodynamics computer code developed from a scheme described by John Zinn of LASL. The transport scheme described by John Zinn and Incorporated into RADHOT requires just two passes thru the mesh to determine fluxes and energy deposition rates. The scheme assumes local thermodynamic equilibrium for each cell, and also assumes that the thermal radiation flux contribution in a given direction at any point has one of two values depending upon whether a ray in that direction intersects the source region. The RADHOT code currently suffers from a lack of valid opacity data. The code as currently written is extremely slow and expensive to run. A user's guide and a listing the code are provided as a starting point for future work. (Author)

AD-A100 638/6 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Application of Finite Elements and Space-Angle Synthesis to the Anisotropic Steady State Boltzmann (Transport) Equation.
Master's thesis,
Eze E. Wills. Mar 81, 174p Rept no. AFIT/GNE/PH/81-13

A finite element space-angle synthesis (FESAS) solution of the steady state anisotropic Boltzmann equation in a two-dimensional cylindrical geometry was developed. Starting from a variational principle the Bubnov-Galerkin solution method was applied to the second order even parity form of the Boltzmann equation. A trial function flux expansion in bicubic splines and spherical (surface) harmonics was used. A first scatter (collision) source and an exponentially varying atmosphere were also incorporated. FESAS was developed as an alternate solution approach and an improvement in comparison to the methods of Monte Carlo and discrete ordinates. FESAS does not have the inherent characteristics which have produced the ray effect problem in discrete ordinates; also, FESAS may result in lower computational costs. The second order even parity form of the Boltzmann equation was derived and shown to be symmetric, positive definite and self-adjoint. The equivalence of a variational minimization principle and the Bubnov-Galerkin method of weighted residuals was established. The FESAS system of equations was expanded and a numerical computer solution approach was implemented.

AD-A100 698/0 PC **A04**/MF **A01**
California Research and Technology, Inc., Woodland Hills.
Stress Wave Interactions with Tunnels Buried in Well-Characterized Jointed Media.
Final rept. 4 May 77-1 Jun 80,
Martin Rosenblatt, and Larry A. DeAngelo. 1 Jun 80, 64p CRT-3170F, DNA-5334F
Contracts DNA001-77-C-0203, DNA001-79-C-0278

For the DIABLO HAWK underground nuclear test, several small-scale tunnels were constructed in jointed rock simulant material and stress loaded to approximately 0.8 kbar = 11.6 ksi. These tunnel response tests represented an opportunity to evaluate whether successful pre-shot predictions of tunnel closure and block motion could be made for tunnels buried in a well-characterized jointed media. In this report, numerical simulation predictions using computer code techniques which explicitly treat the idealized joints are described and compared to data from the recovered experimental model. The tunnel closure predictions and the predicted locations of block motion are in reasonable agreement with some experimental data. Other aspects of the study included: development and application of an analytical technique for predicting joint activation conditions (i.e., block motions) for specified joint orientations and locations near the tunnel surface, calculations and comparisons of tunnel response to dynamic and quasi-static stress loads, and investigation of the effects of joint friction on tunnel damage. (Author)

AD-A100 884/6 PC **A06**/MF **A01**
Information Science, Inc., Santa Barbara, CA.
Characterization of Starfish Striations from Analysis of Photographic Records.
Final rept. 1 May 78-31 May 79,
Walter F. Dudziak, and Pradip V. Lad. 30 Jun 79, 102p RM79ISI101, DNA-5065F
Contract DNA001-77-C-0170

The report summarizes the results of an extensive analysis in the frequency domain of photographic records that recorded, over Canton Island, the late time striations which resulted from the STARFISH nuclear detonation. The basis of this analysis are the frequency domain power spectral densities (PSDs) which were determined from relative optical radiances at various altitudes as a function of time. The analysis indicates how well the time/altitude variance of the power spectra can be represented by a simple analytic expression: (1) a log-log linear (power law) fit; (2) an exponential fit in the frequency domain. It has been found that both of the single simplified expressions underestimate the power at low frequencies. However, for a single simple expression, the log-log linear fit is a better representation of the data at very low frequencies. The report also synthesizes a value for the total number of striations, a radius probability distribution and the spatial area/volume contained within the striations from the exponential fit; (in this synthesis, the striations are assumed to have Gaussian electron density profiles). On this basis, a volume emission from the striated region is determined from which an estimate can be made on the on-axis striation electron density. (Author)

AD-A101 091/7 MF **A01**
Strategic Air Command, Offutt AFB, NE. Aircraft Engineering Div.
Nuclear Blast Program for Mini-Calculators.
Engineering rept.,
Rayford P. Patrick. 9 Mar 81, 16p Rept no. SAC/LGME-ER-S-111
Availability: Microfiche copies only.

A program has been written for the HP-97 (HP-67) minicomputer to solve the blast wave from a nuclear detonation. The program first determines standard-altitude parameters for the altitude of interest. Using these parameters as input, the program then calculates pressures, temperatures, densities, velocities, and Mach Numbers in front and behind the shock. Three subroutines allows the user to input (for any altitude < or = 82,000 ft) a specific overpressure across the shock, a specific gust velocity behind the blast wave, or a specific dynamic pressure behind the blast wave. Corresponding parameters for each input are calculated. (Author)

AD-A101 123/8 PC **A03**/MF **A01**
Sierra Geophysics, Inc., Arcadia, CA.
Time Domain Waveform Inversion of Short-Period P-Waves for Nuclear Explosion Source Time Functions.
Technical rept.,
Larry J. Ruff. 9 Jan 81, 43p SGI-R-80-034, AFOSR-TR-81-0495
Contract F49620-79-C-0012, ARPA Order-3291

This research investigates the estimation of the source time parameters of underground nuclear explosions from the waveforms of short-period teleseismic P-waves. In the simplest consideration, and when the source yield is unconstrained, there are only three source parameters, two that describe the source time function and one for the delay time of the (p)P phase. There are, of course, indications that the (p)P arrival may not have the same amplitude or shape as the direct P arrival, presumably due to anelastic or nonlinear effects between the shot point and the surface. Thus, we will also consider the effect on the waveforms of a decreased (p)P amplitude. Another parameter which has a significant influence upon the observed waveforms is t (t = travel time/Q(av). Accordingly, the variations in the source parameter estimates due to a varying t will also be addressed. (Author)

18D. Nuclear Instrumentation

DOE/ER/00511-T1 PC **A02**/MF **A01**
Hawaii Univ., Honolulu.
Angular and Energy Resolution of the DUMAND Optical Array.
V. J. Stenger, G. N. Taylor, and A. Roberts. 1978, 6p
Contract AC03-76ER00511

In an initial simulation of the response of the DUMAND optical array to the Cerenkov light from multi-TeV muons and hadronic cascades we find a muon angular resolution which is better than 15 mr above 10 TeV. The muon energy resolution is 60% at 5 TeV but improves to 45% and is approximately energy-independent above 10 TeV. The energy resolution of the hadronic cascade is given by delta E/sub H/ = 2.3 + .3E/sub H/ TeV. With these errors we can detect the presence of the W-boson propagator in deeply inelastic interactions induced by atmospheric neutrinos above 10 TeV in a few month's running with the currently conceived 1 km exp 3 array. Point sources of extraterrestrial neutrinos above a few TeV can be located to a fraction of 10 exp -5 of the celestial sphere. Multiple muon events induced in the upper atmosphere by primary cosmic rays can be studied with the possibility of measuring the invariant mass of any supermassive objects decaying into two muons. (ERA citation 06:022511)

LA-UR-81-1512 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
CAMAC Gamma Ray Scanning System.
C. E. Moss, J. C. Pratt, and E. R. Shunk. 1981, 30p

Contract W-7405-ENG-36

A flexible gamma-ray scanning system, based on a LeCroy 3500 multichannel analyzer and CAMAC modules, is described. The system is designed for making simultaneous passive and active scans of objects of interest to nuclear safeguards. The scanner is a stepping-motor-driven carriage; the detectors, a bismuth-germanate scintillator and a high-purity germanium detector. A total of sixteen peaks in the two detector-produced spectra can be integrated simultaneously, and any scan can be viewed during data acquisition. For active scanning, the 2615-keV gamma-ray line from a exp 232 U source and the 4439-keV gamma-ray line from exp 9 Be(alpha ,n) exp 12 C were selected. The system can be easily reconfigured to accommodate up to seven detectors because it is based on CAMAC modules and FORTRAN. The system is designed for field use and is easily transported. Examples of passive and active scans are presented. (ERA citation 06:021697)

18E. Nuclear Power Plants

NUREG/CR-1577 PC **A16**/MF **A01**
Rondout Associates, Inc., Stone Ridge, NY.
An Approach to Seismic Zonation for Siting Nuclear Electric Power Generating Facilities in the Eastern United States.
Final technical rept. 28 Sep 78-28 Sep 80,
N. L. Barstow, K. G. Brill, Jr., O. W. Nuttli, and P. W. Pomeroy. May 81, 366p
Color illustrations reproduced in black and white.

Test sets of seismic versus non-seismic areas in the east and central United States are discriminated from each other, using multivariate statistics which select combinations of variables that classify the areas as seismic or non-seismic. Seventy percent of seismic test areas and 75 percent of non-seismic test areas are successfully classified using the variables: distance to a Pre-Triassic rift, number of faults, and number of fault/intrusive intersections. Better classification, however, is achieved when test areas are divided into regionally homogeneous subsets. For example, in the central U.S. 90.9% seismic and 78.6% non-seismic areas are correctly classified with the variables for: major arches and basins, gravity differential, and major rivers. These same variables are used to classify additional test areas in the central U.S., and the classifications for these correlate well with known seismicity. Ten seismic source zones in the central U.S. are independently delineated by a qualitative association of historical earthquakes with geologic features. Source zones are associated with basement rifts; e.g., New Madrid, basement faults, e.g., Colorado Lineament, and major uplifts and basins, e.g., Cincinnati Arch. These associations support the results of the statistically determined variables that distinguish seismic from non-seismic areas.

NUREG/CR-1748 PC **E06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Hazards to Nuclear Power Plants from Nearby Accidents Involving Hazardous Material - Preliminary Assessment.
Technical rept.,
David E. Bennett, and Nancy C. Finley. May 81, 130p SAND-80-2334
Includes two sheets of 48X reduction microfiche.

This report describes a preliminary or scoping assessment of the vulnerability of commercial, light water reactor (LWR) plants to the effects of nearby, but offsite, accidents involving hazardous materials. The hazardous environments resulting from these accidents could degrade or threaten the safe operation or safe shutdown capability of the plant. This assessment is the initial part of a program to develop a comprehensive methodology for evaluating the effects of such accidents. Transportation accidents (road, rail, pipeline, etc.) and accidents at fixed storage facilities are considered, with the principal emphasis on transportation accidents. The current regulations covering the safety analysis for hazardous materials accidents are reviewed.

NUREG-0020-V5-N5 PC **A08**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Licensed Operating Reactors. Volume 5, Number 5. Data as of May 30, 1981.
Status summary rept.
Jun 81, 164p
See also Volume 5, Number 3, NUREG-0020-V5-N3.

The Operating Units Status Report - Licensed Operating Reactors provides data on the operation of nuclear units as timely and accurately as possible. This information is collected by the Office of Management and Program Analysis from the Headquarters staff of NRC's Office of Inspection and Enforcement, from NRC's Regional Offices, and from utilities. The three sections of the report are: monthly highlights and statistics for commercial operating units, and errata from previously reported data; a compilation of detailed information on each unit, provided by NRC's Regional Offices, IE Headquarters and the utilities; and an appendix for miscellaneous information such as spent fuel storage capability, reactor-years of experience and non-power reactors in the U.S. It is hoped the report is helpful to all agencies and individuals interested in maintaining an awareness of the U.S. energy situation as a whole.

NUREG-0022-SUP-N5 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Construction of Pilgrim Nuclear Generating Station, Unit No. 2; Docket No. 50-471; Boston Edison Company, et. al. Supplement No. 5.
Safety evaluation rept.
May 81, 34p
See also Supplement Number 4, PB-291 849.

Supplement No. 5 to the Safety Evaluation Report for the application filed by Boston Edison Company for a construction permit to construct the Pilgrim Nuclear Power Station, Unit 2 (Docket No. 50-471) located in the township of Plymouth, Massachusetts has been issued by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. This supplement presents the staff's analysis of information submitted by the applicant in response to the Final Emergency Planning Rule and related staff questions.

NUREG-0517-SUP-N6 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Salem Nuclear Generating Station, Unit No. 2; Docket No. 50-311; Public Service Electric and Gas Company, et al. Supplement No. 6.
Safety evaluation rept.
May 81, 62p
See also Supplement Number 5, NUREG-0517-SUP-N5.

Supplement No. 6 to the Safety Evaluation Report for the application filed by Public Service Electric and Gas Company, Philadelphia Electric Company, Delmarva Power and Light Company, and Atlantic City Electric Company for a license to operate the Salem Nuclear Generating Station, Unit No. 2 (Docket No. 50-311) located in Salem County, New Jersey has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. The purpose of this supplement is to further update the Safety Evaluation Report by providing (1) our findings from additional audits of the licensees' equipment qualification program, (2) our evaluation and status of the licensees' fire protection program, and (3) our evaluation and status of the licensees' emergency preparedness. Based on our evaluation of the application as set forth in the Safety Evaluation Report and its Supplements 1 - 6, we have concluded that Salem 2 can be operated in accordance with Facility Operating License DPR-75, and its Technical Specifications, without endangering the health and safety of the public.

NUREG-0528-SUP-N1 PC **A13**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Wm. H. Zimmer Nuclear Power Station, Unit No. 1; Docket No. 50-358; Cincinnati Gas and Electric Company. Supplement No. 1.
Safety evaluation rept. Feb 79-Jun 81.
Jun 81, 300p

The Safety Evaluation Report for the Zimmer Nuclear Power Station, Unit 1 was issued in January 1979. At the time of issuance there were two outstanding issues. Supplement No. 1 discusses the resolution of these issues and the concerns of the Advisory Committee on Reactor Safeguards, which issued a favorable report on March 13, 1979. This supplement presents the Staff's bases for proceeding with licensing prior to resolution of the generic matters covered by the Task Action Plans outlined in NUREG-0410, 'NRC Program for the Resolution of Generic Items Related to Nuclear Power Plants,' and also presents the status of TMI Action Plan items listed in NUREG-0737, 'Clarification of TMI Action Plan Requirements.' The review will continue until the unit is operating. The Zimmer Nuclear Power Station is located in Washington Township, Clermont County, Ohio.

NUREG-0620 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications for Sequoyah Nuclear Plant, Units 1 and 2; Docket Nos. 50-327 and 50-328; Appendix 'B' to License Nos. DPR-77 and DPR-79.
Jun 81, 18p

The Sequoyah Nuclear Plant, Units 1 and 2, Technical Specifications were prepared by the Office of Nuclear Reactor Regulation. They set forth the limiting conditions for operations and surveillance requirements pertaining to non-radiological limits.

NUREG-0717-SUP-N2 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Virgil C. Summer Nuclear Station, Unit No. 1; Docket No. 50-395; South Carolina Electric and Gas Company. Supplement No. 2.
Safety evaluation rept.
May 81, 33p
See also Supplement No. 1, NUREG-0717-SUP-N1.

Supplement No. 2 to the Safety Evaluation related to the operation of the Virgil C. Summer Station, Unit 1 updates the emergency planning information contained in the Safety Evaluation Report issued in February 1981. Supplement No. 1 to the Safety Evaluation Report issued in April 1981 updated information contained in the Safety Evaluation Report. On December 10, 1976, the South Carolina Electric & Gas Company filed an application for a license to operate the Virgil C. Summer Nuclear Station. Subject to favorable resolution of the items discussed in the Safety Evaluation Report and Supplements 1 & 2, the staff of the Office of the Nuclear Reactor Regulation concludes that the plant can be operated without endangering the health and safety of the public.

NUREG-0789 PC **A22**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications for Sequoyah Nuclear Plant, Unit No. 2; Docket No. 50-328; Appendix 'A' to License No. DPR-79.
Jun 81, 506p

The Sequoyah Unit 2 Technical Specifications were prepared by the U.S. Nuclear Regulatory Commission to specify the limits, operating conditions and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR 50 for the protection of the health and safety of the public.

PB81-213589 PC **A04**/MF **A01**
Office of Technology Assessment, Washington, DC.
Nuclear Plant Standardization: Light Water Reactors,
Apr 81, 75p OTA-E-134

This report evaluates the extent to which nuclear powerplants can and should be standardized. The assessment provides the essential background material for a broad understanding of the nuclear industry, its institutions and their relationship to standardization. Items presented in the report include specific examples of the current state of nu-

clear powerplant standardization, and four different concepts of standardization and their potential impact on safety. These concepts represent a wide range of approaches toward standardization and would entail greatly differing requirements for industry and regulators as well as differing implications for safety.

18F. Radiation Shielding and Protection

BNL-NCS-29035 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
New Aspects in the Evaluation of Thermal Neutron Cross Sections.
S. F. Mughabghab. 1980, 32p CONF-800979-16
Contract AC02-76CH00016
Workshop on nuclear data evaluation methods and procedures, Upton, NY, USA, 22 Sep 1980.

Because of recent advances in experimental techniques, which improved the accuracies of thermal capture and scattering cross sections by an order of magnitude, a more stringent approach in the evaluation of the thermal constants is developed. In the present approach, the following aspects are introduced: (1) a consistency between thermal cross sections, coherent and incoherent scattering lengths, and neutron resonance parameters is achieved; (2) a consistency between the isotopic and element cross sections is sought; in addition, for each isotope, the requirement that the partial cross sections add up to the total is fulfilled; (3) where possible, charged particle data particularly derived from (d,p) reactions on light and medium weight isotopes are used in locating the positions and strengths of bound levels. Such a procedure is useful in the evaluation of the shape of the cross sections in the thermal region; and (4) the Lane-Lynn theory of direct capture is called upon to calculate thermal cross sections and check ior consistencies for certain isotopes. Extensive examples to illustrate these procedures are presented. (ERA citation 06:022858)

DE81024154 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Momentum Exchange by Photons in an Absorbing and Scattering Medium.
A. L. Edwards. 10 Jun 81, 14p UCID-19064
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

This report summarizes the equations for exchange of linear momentum between photons and an absorbing and scattering medium. Mechanisms are not discussed, but are represented by given cross sections. Momentum exchange at discrete points, and continuously along straight line segments are discussed. Equations are given for cartesian coordinates, the radial and axial coordinates in cylindrical geometry, and the radial coordinate in spherical geometry. A general class of energy and momentum exchange methods is discussed, and useful approximations given for the radial component of linear momentum deposition. (ERA citation 06:024512)

18G. Radioactive Wastes and Fission Products

CONF-8005107- PC **A17**/MF **A01**
Oak Ridge National Lab., TN.
Alternate Nuclear Waste Forms and Interactions in Geologic Media.
L. A. Boatner, and G. C. Battle, Jr. Apr 81, 396p
Alternate waste form information workshop, Gatlinburg, TN, USA, 13 May 1980.

The primary purposes of the conference on Alternate Nuclear Waste Forms and Interactions in Geologic Media were: First, to provide an opportunity for a review of the status of the research on some of the candidate alternative waste forms; second, to provide an opportunity for comparing the characteristics of alternate waste forms to those of glasses; and third, to stimulate increased interactions between those research groups that were engaged in a more basic approach to characterizing waste forms and those who were concerned with more applied aspects such as the processing of these materials. The motivating philosophy behind this third purpose of the conference was based on the idea that by operating from the soundest possible fundamental base for any of the candidate waste forms, hopefully any future unpleasant surprise - such as that alluded to earlier in the case of glass waste forms - could be avoided. Separate abstracts have been prepared for individual papers for inclusion in the Energy Data Base. (ERA citation 06:021653)

CONF-810482-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Conceptual Aspects of Fiscal Interactions Between Local Governments and Federally-Owned, High-Level Radioactive Waste-Isolation Facilities.
D. J. Bjornstad, and K. E. Johnson. 1981, 30p
Contract W-7405-ENG-26
Annual meeting of Southern Regional Science Association, Washington, DC, USA, 14 Apr 1981.

This paper examines a number of ways to transfer revenues between a federally-owned high level radioactive waste isolation facility (hereafter simply, facility) and local governments. Such payments could be used to lessen fiscal disincentives or to provide fiscal incentives for communities to host waste isolation facilities. Two facility characteristics which necessitate these actions are singled out for attention. First, because the facility is federally owned, it is not liable for state and local taxes and may be viewed by communities as a fiscal liability. Several types of payment plans to correct this deficiency are examined. The major conclusion is that while removal of disincentives or creation of incentives is possible, plans based on cost compensation that fail to consider opportunity costs cannot create incentives and are likely to create disincentives. Second, communities other than that in which the facility is sited may experience costs due to the siting and may, therefore, oppose it. These costs (which also accrue to the host community) arise due to the element of risk which the public generally associates with proximity to the transport and storage of radioactive materials. It is concluded that under certain circumstances compensatory payments are possible, but that measuring these costs will pose difficulty. (ERA citation 06:023199)

DE81023146 PC **A06**/MF **A01**
TRW Energy Systems Planning Div., McLean, VA.
Economics of Mined Geologic Repositories.
J. D. Forster. Dec 79, 122p ONWI-93
Contract AC06-76RL01830
Microfiche only after original copies are exhausted.

The purpose of this study was to estimate the effects on total cost and unit cost of several major alternatives relating to commercial nuclear waste geologic repositories. The study is in three parts: a review of recent studies, cost uncertainty analyses, and a parametric analysis. The review of recent studies brings together the major economic results of six repository design studies. The recent studies indicate that unit costs for repositories in salt media are the lowest regardless of waste form. However, waste form minimum unit costs varied from media to media. Repository cost uncertainties are categorized as cost component uncertainties, design/scope uncertainties, and economic uncertainties. Each type is discussed qualitatively. An estimate of the magnitude of each type of uncertainty is developed based on the assumption that a nuclear waste repository will experience a similar cost growth pattern to that experienced with other large non-military government funded projects. These estimates of project uncertainty contributions rank design/scope uncertainties highest, economic uncertainties second, and cost component uncertainties lowest. The parametric analysis used the existing National Waste Terminal Storage Economic Evaluation Model to evaluate the effects of key variables on the cost of a baseline repository scenario. Mining methods (advance versus retreat mining, boring versus drum mining machines) were found to play a key role in repository economics. The principal conclusions of this report are that nuclear waste repository cost uncertainties can be expected to be quite large. Reasonable variations in the individual parameters which characterize a repository, however, cause only moderate cost effects. The potential effects of variations in regulatory policy were not quantified and could not be included in the parametric analysis. (ERA citation 06:023206)

DP-MS-81-5 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Decontamination Processes for Waste Glass Canisters.
W. N. Rankin. 1981, 35p CONF-810606-37
Contract AC09-76SR00001
American Nuclear Society's annual meeting, Miami Beach, FL, USA, 7 Jun 1981.

The process which will be used to decontaminate waste glass canisters at the Savannah River Plant consists of: decontamination (slurry blasting); rinse (high-pressure water); and spot decontamination (high-pressure water plus slurry). No additional waste will be produced by this process because glass frit used in decontamination will be mixed with the radioactive waste and fed into the glass melter. Decontamination of waste glass canisters with chemical and abrasive blasting techniques was investigated. The ability of a chemical technique with HNO sub 3 -HF and H sub 2 C sub 2 O sub 4 to remove baked-on contamination was demonstrated. A correlation between oxide removal and decontamination was observed. Oxide removal and, thus, decontamination by abrasive blasting techniques with glass frit as the abrasive was proposed and demonstrated. (ERA citation 06:023202)

LA-UR-81-1385 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Low-Level-Waste-Disposal Methodologies.
M. L. Wheeler, and K. Dragonette. 1981, 13p
CONF-810606-36
Contract W-7405-ENG-36
American Nuclear Society's annual meeting, Miami Beach, FL, USA, 7 Jun 1981.

This report covers the followng: (1) history of low level waste disposal; (2) current practice at the five major DOE burial sites and six commercial sites with dominant features of these sites and radionuclide content of major waste types summarized in tables; (3) site performance with performance record on burial sites tabulated; and (4) proposed solutions. Shallow burial of low level waste is a continuously evolving practice, and each site has developed its own solutions to the handling and disposal of unusual waste forms. There are no existing national standards for such disposal. However, improvements in the methodology for low level waste disposal are occurring on several fronts. Standardized criteria are being developed by both the Nuclear Regulatory Commission (NRC) and by DOE. Improved techniques for shallow burial are evolving at both commercial and DOE facilities, as well as through research sponsored by NRC, DOE, and the Environmental Protection Agency. Alternatives to shallow burial, such as deeper burial or the use of mined cavities is also being investigated by DOE. (ERA citation 06:021672)

LBL-12478 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Hydraulic Fracturing and Overcoring Stress Measurements in a Deep Borehole at the Stripa Test Mine, Sweden.
T. Doe, K. Ingevald, L. Strindell, B. Haimson, and H. Carlsson. Mar 81, 9p CONF-810624-6
Contract W-7405-ENG-48
22. US symposium on rock mechanics, Cambridge, MA, USA, 29 Jun 1981.

Recently, a workable method was developed for performing overcoring measurements in holes hundreds of meters in length. With the need to obtain in situ stress values for nuclear waste disposal simulation experiments at the Stripa Mine in central Sweden, the task of running both the Power Board's Leeman triaxial cell and hydraulic fracturing in the same hole was undertaken. This paper is a report of the results of the comparative measurements. 9 figures, 1 table. (ERA citation 06:021673)

NUREG/CR-1763 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Characteristics of Wastes and Soils Affecting Transport of Radionuclides Through the Soil and Their Relationship to Waste Management: Annual Report FY '79.
Progress rept.,
Eric B. Fowler, Wilfred L. Polzer, and Edward H. Essington. May 81, 40p LA-8563-PR

Investigations of waste/soil interactions have continued. Studies on the attenuation of plutonium species, uranium species, 241Am and 137Cs by four different soils for two different wastes have been completed. The degree of attenuation for a specific radionuclide varies among soils. A specific soil attenuates different radionuclides to different degrees; 137Cs is attenuated to the highest degree by all soils. Soils from the Ap and A2 horizon of a South Carolina Fuquay soil when reacted with waste dissolve plutonium, americium, iron, and aluminum from the insoluble fraction of the waste. The dissolved plutonium and americium are not sorbed by the soil thus are potentially mobile and are considered to be complexed, possibly by an organic chelate from the soil metabolic pool. When the degrees of sorption for horizon soils from Fuquay and Fayette soil profiles are compared, the ability to solubilize was found to be unique to the Fuquay Ap and A2. The lower horizons, B2t and C, of the Fuquay soil have a high sorptive capacity for all of the radionuclides studied. Emphasis will be placed on a field study in FY '80 at the Maxey Flats, Kentucky shallow land burial site. Soil solution samples will be obtained at various depths and locations using porous cups. Soil will be obtained for analyses from the same locations. Sampling of the soil solutions will provide data relative to the presence and concentration of mobile radionuclides. Dr. Robert Schulz, University of California, Berkeley, will implant electric soil moisture sensors for the determination of soil moisture movement. Those data will be correlated with results from chemical, physical, and radiochemical analyses.

NUREG/CR-1852-V5 PC **A05**/MF **A01**
Washington Univ., Seattle. Coll. of Fisheries.
Distribution Coefficients for Radionuclides in Aquatic Environments. Volume 5. Adsorption and Desorption Studies of Plutonium and Americium.
Topical rept.,
A. L. Sanchez, W. R. Schell, and T. H. Sibley. Jun 81, 77p
See also Volume 1, NUREG/CR-1852-V1.

The distribution coefficents of two important transuranic elements, plutonium and americium, were measured experimentally in several freshwater, estuarine, and marine systems to evaluate the magnitude of their interactions with sediments. The Kd values for sorption of these radionuclides ranged from 1,000 to 1,000,000 ml/g in all the sediment-water systems studied, in agreement with their Kd values reported in the literature. Significant differences between the Kd values obtained for different experimental systems suggest that the amount of Pu and Am removed by sediment particles depends on the sediment type and the water composition. The Kd for desorption of the radionuclides was measured and found to be considerably greater than the sorption Kds in most cases. This indicates that the radionuclide-sediment interactions were not completely reversible under the experimental conditions. The effects of pH and sediment concentration on the Kd values were also investigated. There were significant changes in the Kd values as these parameters were varied. Experiments using sterilized and non-sterilized samples were conducted for some of the sediment-water systems to evaluate possible bacterial effects on Kd. Finally, dialysis experiments were performed to determine the relative importance of suspended sediments, organic detritus, and phytoplankton in removing these radionuclides from both fresh and marine waters.

NUREG/CR-1852-V7 PC **A03**/MF **A01**
Washington Univ., Seattle. Coll. of Fisheries.
Distribution Coefficients for Radionuclides in Aquatic Environments: Adsorption and Desorption Studies of 244Cm.
Topical rept.,
E. A. Wurtz, T. H. Sibley, and W. R. Schell. Jun 81, 31p
See also Volume 4, NUREG/CR-1852-V4.

Although little information is available for comparison, the adsorptive properties of curium and americium in natural aquatic environments are expected to be similar due to their nearly identical physical and chemical properties. This study measures curium adsorption distribution coefficients for sediment-water samples collected from the Hudson River, its estuary and Cattaraugus Creek, New York, and curium desorption distribution coefficients for the Hudson River. The effect of sediment concentration and pH on adsorption was determined. The results are compared to results obtained for americium reported by Sanchez et al. utilizing the same sediment-water samples.

ONWI-234 PC **A09**/MF **A01**
Stearns-Roger Services, Inc., Denver, CO.
Technical Summary and Index for National Waste Terminal Storage Repository No. 1 and No. 2 Conceptual Design Reports, Special Study No. 6.
Dec 80, 180p
Contracts AC06-76RL01830, AC06-77RL90283

This report is intended to facilitate the use of the Conceptual Design Reports prepared for NWTSR No. 1 and No. 2. The NWTSR No. 1 Conceptual Design Report prepared by Stearns-Roger consists of 21 volumes comprising 56 separately bound parts. The NWTSR No. 2 Conceptual Design Report prepared by Kaiser Engineers consists of 26 volumes comprising 44 separately bound parts. The Conceptual Design Criteria prepared by UCC-ND, X-OE-17 Y/OWI/TM-9 is also included. This report consists of three major sections: an overview discussion (Section II) a synopsis and summary of the volumes of the two CDR's (Section III) and a technical index (Section IV). In addition this report contains a brief glossary of terms used in discussing radioactive waste isolation in geologic formations. (ERA citation 06:021679)

PB81-217721 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
Study on the Environmental Impact of the Conversion of Plutonium Nitrate Coming from the Reprocessing of Mixed Oxide Fuel Instead of Uranium Fuel.
Final rept.,
c1980, 131p EUR-6829-EN, ISBN-92-825-1866-3
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The effect on the environment of a plant for the conversion of plutonium nitrate, originating from mixed oxide fuel rather than uranium fuel, is assessed for a throughput of 5 kg of plutonium per day in batch-type operation. It is concluded that present safety techniques at the plant when second generation plutonium is used, are sufficient to safeguard the environment. (Copyright (c) ECSC-EEC-EAEC, Brussels and Luxembourg, 1980.)

PB81-222002 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC.
Short- and Long-Term Leach Rates of Solidified Waste from a Cylindrical Container.
Kerry Landman. Jun 81, 29p EPA-520/8-81-007

The short- and long-term leach rates of radionuclides for the three-dimensional diffusive flow and for purely axial diffusive flow from a finite cylinder of solidified waste are determined here. These analytical results are compared with the ones obtained numerically by Hung for purely axial flow.

PNL-3817 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Use of Geohydrologic Response Functions in the Assessment of Deep Nuclear Waste Repositories: Assessment of Effectiveness of Geologic Isolation Systems.
R. W. Nelson. May 81, 53p
Contract AC06-76RL01830

Geohydrologic Response Functions (GRFs) interrelate the three vital factors needed in the repository decision-making process: the quantity, arrival time, and location of contamination reaching the biosphere. GRFs further focus attention upon two related and additive parameters: the initial delay time and delay spread time. After the principal site selection, the GRFs may be applied to obtain more detailed performance evaluations concerning specific nuclides or waste components, specific results for various types of accidental release, and effects of a variety of contaminant source terms or leach models. The response functions may be applied to consider contaminant reductions and delays through material sorption as well as through a variety of other interactions and effects. (ERA citation 06:021692)

RHO-CD-972 PC **A09**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Spent-Fuel Dry-Storage-Concept Evaluation.
K. N. Singh, and J. R. LaRiviere. 1981, 184p
Contract AC06-77RL01030

This report gives an assessment of several dry modes for interim storage of commercial light water reactor (LWR) spent fuel and recommends the dry well concept. The Dry Storage Facility (DSF) will receive, encapsulate, and store the canisterized spent fuel in vertical dry wells located near the ground surface. The canisters are designed to be retrievable. The study is based on locating the DSF at Hanford. However, only minor changes would be required if another site with similar climatic conditions were chosen. (ERA citation 06:021683)

18H. Radioactivity

AD-A100 760/8 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Multiburst Fallout Model for Operational Type Studies.
Master's thesis,
John F. Crandley, Jr. Mar 81, 86p Rept no. AFIT/GST/PH/81M-1

A method is developed for calculating fallout deposition down-wind from a massive nuclear attack on a small target area over a short time span. This is accomplished using existing smear codes and replacing their existing horizontal activity distribution with an approximating function. This function is the difference between two cumulative normal functions which are shown to result from superposition of individual bursts. A comparison is made between the contours predicted by this new code and contours predicted by the old, time-consuming, iterative procedures. The new code has been employed in several different scenarios involving the proposed MX field to determine the resulting dose contours from a massive attack against that field. (Author)

AD-A100 804/4 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
X-Ray Fluence and Transmission and Prompt Radiation Fluence or Dose.
Master's thesis,
Donald Edwin Jones. Mar 81, 85p Rept no. AFIT/GNE/PH/81M-5

This report is to validate and evaluate a Horizons Technology Inc. (HTI) TI-59 program written to calculate the free field x-ray fluence from a nuclear burst. In addition to this validation of an existing program, programs were written to compute mass integral and prompt radiation effects. X-ray transmission is calculated using a build-up factor method and is compared to results from the HTI program. Results are compared for black-body temperatures of 0.1, 1.0, and 10.0 keV and mass integrals from 0.000001 to 10.0gm/sq.cm. The results compare well with a maximum error of approximately 21%. HTI's program has a minor problem as the transmission factor approaches zero so a TI-59 program is provided for use in that regime. A quick FORTRAN program is provided to calculate the fluence reaching a receiver. TI-59 and

FORTRAN programs are given to calculate the mass penetrated and prompt radiation fluence or dose. (Author)

DOE/EML-392 PC **A05**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Environmental Measurements Laboratory Annual Report, Calendar Year 1980.
H. L. Volchok. May 81, 99p

The 1980 Annual Report is presented as a series of abstracts, organized by broad programmatic headings under the five technical Laboratory Divisions and one Branch. In addition, a short section appears at the end of the report describing the organization, staff, outside activities and our publications and presentations for the year. Research performaed by the Environmental Studies Division is reported under the following categories: high altitude sampling program, deposition and surface air, and the biosphere. Measurement methods research and air quality field studies are reported by the Aerosol Studies Division. The Radiation Physics Division reported research on radiation transport theory, radiation dosimetry, environmental radioactivity, and the assessment of non-nuclear energy technologies. Research in the Analytical Chemistry Division is reported on quality assurance, analytical support of research projects, analytical development for research projects, and programmatic research. The Instrumentation Division reported research on the development of instrumentation in various categories. The Applied Mathematics Branch reported results of programs for aerosol studies, analytical chemistry, environmental studies, and radiation physics. (ERA citation 06:022672)

IDO-22060 PC **A05**/MF **A01**
Geological Survey, Idaho Falls, ID. Water Resources Div.
Hydrologic Conditions at the Idaho National Engineering Laboratory, Idaho. Emphasis: 1974-1978.
J. T. Barraclough, B. D. Lewis, and R. G. Jensen. Apr 81, 85p USGS-OFR-810526

The Idaho National Engineering Laboratory (INEL) site covers about 890 square miles of the eastern Snake River Plain and overlies the Snake River Plain aquifer. Low concentrations of aqueous chemical and radioactive wastes have been discharged to shallow ponds and to shallow or deep wells on the site since 1952. This report covers the water-level and water-quality data collected by the US Geological Survey during the calendar years 1974 through 1978, and the resulting hydrologic interpretations. (ERA citation 06:022594)

LBL-11616(V.2) PC **A09**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Migration of Radionuclides Through Sorbing Media Analytical Solutions--II.
T. H. Pigford, P. L. Chambre, and M. Albert. Oct 80, 192p
Contract W-7405-ENG-48

This report presents analytical solutions, and the results of such solutions, for the migration of radionuclides in geologic media. Volume 1 contains analytical solutions for one-dimensional equilibrium transport in infinite media and multilayered media. One-dimensional non-equilibrium transport solutions are also included. Volume 2 contains analytical solutions for transport in a one-dimensional field flow with transverse dispersion as well as transport in multi-dimensional flow. A finite element solution of the transport of radionuclides through porous media is discussed. (ERA citation 06:020924)

18I. Reactor Engineering and Operation

CONF-810203-12 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Elevated Temperature Mechanical Properties of a Flux Cored Arc Weldment.
M. G. Cowgill, and K. C. Thomas. 1981, 18p
Contract AC15-76CL02395
110. annual meeting of the AIME, Chicago, IL, USA, 22 Feb 1981.

The cell liner concept used in the design of liquid metal fast breeder reactors has the dual function of preventing inert gas leaks between the cells and preventing excessive damage to the concrete, to which the liners are attached, in the event of a hot sodium spill. The design of the liners has to be based on accurate material property data applicable under all conditions (operating and post-fault) of cell liner operation. Normal operating conditions include temperatures up to 65 exp 0 C but the effects of a high-temperature (up to 590 exp 0 C) sodium spill have been estimated to result in temperatures as high as 927 exp 0 C due to possible exothermic reactions. The steel specified for most cell liners is SA 516 (Grade 55) which is a carbon steel of pressure vessel quality. The mechanical property data available on this material and weldments of it are mostly limited to temperatures of 593 exp 0 C and below. A program was initiated to obtain the required short term tensile properties, as a function of strain rate and temperature, and limited creep rupture properties. All the tests were to be performed in air due to the unfeasibility of trying to duplicate the environmental possibilities which can occur during a sodium spill. The tensile and creep property data on the weldment are reported. (ERA citation 06:023524)

LA-8797-PR PC **A05**/MF **A01**
Los Alamos National Lab., NM.
Energy Technology. Progress Report, October-December 1980.
M. Breslow. Apr 81, 89p
Contract W-7405-ENG-36

A separate abstract was prepared for each of the 8 sections of the report for the Energy Data Base. (ERA citation 06:022043)

NUREG/CR-1157-V4 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Thermal/Hydraulic Analysis Research Program.
Quarterly rept. Oct-Dec 80,
S. L. Thompson. May 81, 58p SAND-80-1091/4
See also NUREG/CR-1157-V3.

A nuclear power plant must be designed to ensure that the consequences of a pipe break will be mitigated. Jet deflectors must be included to prevent damage to safety and control systems. Current NRC models used for two-phase jet load calculations seem to be overly conservative in many cases. The objective of the two-phase jet loads program is to develop an approximate engineering model which better describes the process. This model will be based on experimental data and calculations from multi-dimensional codes. During this past quarter, the effort in this program has been directed toward, (A) Detailed CSQ calculations were performed for the first Marviken free-jet blowdown. (B) Guard pipe calculations were performed and a summary letter delivered to NRC/NRR. (C) Development continued on a fast running, finite difference code for analyzing jet impingement.

NUREG/CR-1594-V1 PC **A08**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Advanced Reactor Safety Research Quarterly Report January-March 1980.
Jun 81, 163p SAND-80-1646-VOL-1
See also report for Apr-Jun 79, NUREG/CR-0984.

This report discusses the recent emphasis toward applying advanced reactor safety technology to LWR Class 9 accident concerns which have been of considerable interest following the accident at TMI-2. For FY 1980, the program is organized in the following subtasks, progress on which is reported herein. Task 1, Energetics. Subtasks: Prompt Burst Energetics, and Irradiated Fuels Response. Task 2, Fuel Dynamics. Subtasks: Transition Phase, Initial and Extended Fuel, Motion, and Fuel Motion Detection. Task 3, Core Debris Behavior-Inherent Retention. Subtasks: Molten Core Containment, PAHR Debris Bed, PAHR Molten Pool, Fragmentation, Sodium Containment and Structural Integrity. Task 4, Aerosol Source Normalization. Task 5, Containment Analysis. Task 6, Elevated Temperature Design Assessment. Task 7, LMFBR Accident Delineation. Task 8, Test and Facility Technology.

NUREG/CR-1624-V2 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Load Combination Program.
Progress rept. no. 6,
C. K. Chou, S. C. Lu, and M. W. Schwartz. May 81, 47p UCID-18674-VOL-2
See also Rept. no. 5, NUREG/CR-1624.

The report gives a general description of the program by project and tasks, together with financial summaries, technical reports generated and meeting attendance. An appendix discusses certain technical subjects.

NUREG/CR-1680 PC **A05**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
WRAP-BWR Verification Studies.
Technical rept. Jan 80-Jun 81,
N. H. Kuehn, F. Beranek, P. B. Parks, and R. L. Reed. Jun 81, 82p DPST-80-3
Contract DE-AC09-76SR00001

A modular computational system known as the Water Reactor Analysis Package-Evaluation Model (WRAP-EM) has been developed for the Nuclear Regulatory Commission (NRC) to interpret and evaluate reactor vendor EM methods and computed results. A subset of the system (WRAP-BWR-EM) provides the computational tools to perform a complete analysis of loss-of-coolant accidents (LOCAs) in boiling water reactors (BWR). A series of calculations modeling tests run on the General Electric Two Loop Test Apparatus, and calculations of a large break in a BWR/4 and BWR/6 plant have verified that the WRAP-BWR-EM system is functioning as intended. Additional calculations using a BWR/6 reference design were run as part of another study to determine the sensitivity of calculated system parameters to code input and the selection of calculational options available.

NUREG/CR-1920 PC **A08**/MF **A01**
Oak Ridge National Lab., TN. Nuclear Safety Information Center.
Index to Nuclear Safety: A Technical Progress Review by Chronology, Permuted Title, and Author, Volume 11(1) through Volume 21(6).
Technical rept.,
William B. Cottrell, and Margaret Passiakos. May 81, 162p ORNL/NUREG/NSIC-186
Contract W-7405-eng-26
Revision to NUREG/CR-1417.Portions of this document are not fully legible.

This index to Nuclear Safety covers articles published in Nuclear Safety, Vol. 11, No. 1 (January-February 1970 through Vol. 21, No. 6 (November-December 1980). The index is divided into three sections: a chronological list of articles (including abstracts), a permuted-title (KWIC) index, and an author index. Nuclear Safety, a bimonthly technical progress review prepared by the Nuclear Safety Information Center, covers all safety aspects of nuclear power reactors and associated facilities. Over 650 technical articles published in Nuclear Safety in the last 11 years are listed in this index.

NUREG/CR-1991 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
TRAC-PD2 Posttest Analysis of CCTF Test C1-16 (Run 025).
Technical rept.,
J. Sugimoto. Jun 81, 41p LA-8741-MS
Contract W-7405-eng-36

The TRAC-PD2 code version was used to analyze CCTF Test C1-16 (Run 025). The results indicate that the core heater rod temperatures, the liquid mass in the vessel, and differential pressures in the primary loop are predicted well, but the void fraction distribution in the core and water accumulation in the upper plenum are not in good agreement with the data.

NUREG/CR-2008 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.

Severe Accident Sequence Assessment and Time-Line Charts for Boiling Water Reactors - Program Overview.
Technical rept.,
M. H. Fontana. Jun 81, 40p ORNL/NUREG/TM-442
Contract W-7405-eng-26

This report documents the initial planning, specification of objectives, uses of results, and plan of attack to be used in the Severe Accident Sequence Analysis Program at the Oak Ridge National Laboratory. A key aspect is the determination of timing of events and a method of displaying and tracking concurrent events. A Sequence-Progression Time-Line Chart was devised for this purpose. As an example, a preliminary assessment of the unperturbed loss of offsite and onsite AC power for Brown's Ferry Unit 1 is described.

NUREG/CR-2020 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Quarterly Progress Report on Blowdown Heat Transfer Separate-Effects Program for October-December 1980.
Technical rept.,
W. G. Craddick, L. J. Ott, T. M. Anklam, M. D. White, and C. B. Mullins. Jun 81, 15p ORNL/NUREG/TM-449
Contract W-7405-eng-26
See also report for Jul-Sep 80, NUREG/CR-1837.

Analysis of the first small break loss-of-coolant accident (LOCA) heat transfer test series was completed. The second small break LOCA heat transfer test series, consisting of 16 tests, was conducted. Analysis of the second transient film boiling test produced results consistent with those of the first such test - the Dougall-Rohsenow film boiling correlation substantially overpredicts the heat transfer. A series of steady-state film boiling tests and a third transient film boiling test were conducted. Initial evaluation of the in-bundle gamma densitometer system reveals anomalous results when fluid temperature exceeds 589 K (600F).

NUREG/CR-2061 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
A Brief Analysis of the Transient Fluid Flow at the Entrance of the Upper Core Structure during a Hypothetical Core Expansion.
Technical rept.,
Dirk Wilhelm. May 81, 25p LA-8806-MS
Contract W-7405-eng-36

SIMMER-II has been used to calculate a one-dimensional approximation to the core expansion following a hypothetical core-disruptive accident in a Liquid Metal Fast Breeder Reactor (LMFBR). The transient, multicomponent, fluid flow at the entrance of the intact upper core structure is the subject of the present investigation. Additional calculations were performed for droplet deposition into and entrainment of liquid films at the upper-core-structure walls and for transient single-phase flows.

NUREG/CR-2090-V1 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Steam-Water Mixing and System Hydrodynamics Program - Task 4.
Quarterly progress rept. 1 Jan-31 Mar 81,
Aryeh Segev, and Robert P. Collier. May 81, 17p BMI-2081
See also NUREG/CR-1927.

During this quarter steady-steam flow data obtained in Creare's 1/5-scale model was analyzed. The experimental results were compared with theoretical predictions, resulting in fairly good agreement. During this quarter, a topical report on the application of a mechanistic model to the refill problem was issued.

NUREG/CR-2126 PC **E05**/MF**$4.50**
EG and G Idaho, Inc., Idaho Falls.
Nuclear Fuel Road Behavior during Normal and Abnormal Operating Conditions - Results of Test PR-1.
Technical rept.,
Daniel T. Sparks, Richard H. Smith, and Richard W. Garner. Jun 81, 68p EGG-2102
Contract DE-AC07-76IDO1570
Includes fifteen sheets of 48X reduction microfiche.

An in-pile experiment to characterize the behavior of boiling-water-reactor-type fuel rods under normal and abnormal operating conditions was performed in the Power Burst Facility. The test, designated PR-1, was performed in February 1979 as part of the Thermal Fuels Behavior Program at EG&G Idaho, Inc. Results from the experiment were obtained in three primary areas of interest: (a) fuel rod thermal response under steady state conditions, (b) thermal-hydraulic conditions at the onset of boiling transition and rod quench during severe power-cooling imbalance operation at pressurized water reactor conditions, and (c) fuel thermal performance during progressively severe power excursions at boiling water reactor hot startup conditions.

NUREG/CR-2136 PC **A05**/MF **A01**
Teledyne Engineering Services, Waltham, MA
Effects of Postulated Event Devices on Normal Operation of Piping Systems in Nuclear Power Plants.
Technical rept.,
Donald F. Landers, Robert D. Hookway, and Kulin D. Desai. May 81, 99p

This report considers the effect of pipe-whip restraints and snubbers on the normal operation of piping systems in nuclear power plants. Also considered are the effect of these postulated event devices on reliability, economics, and the exposure of plant personnel to radiation. Field data were gathered from three nuclear power plants that had applied for Operating Licenses. Criteria, design philosophies, and data were obtained from the respective nuclear steam system suppliers, architects-engineers and utilities.

NUREG/CR-2151 PC **A20**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
The Transient Analysis of DTT Rakes.
Topical rept. 1 Aug 79-31 Mar 80,
P. S. Kamath, and R. T. Lahey, Jr. May 81, 462p EGG-2107
Prepared by Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.

This work involves the development of analytical models and an associated computer code for the determination of the cross-sectionally averaged transient mass flux of a two-phase fluid flowing in a conduit instrumented with a Drag-Disk Turbine Transducer (DTT) Rake and a gamma densitometer with three or more beams. A computer program is included in the report.

NUREG-0304-V6-N1 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Regulatory and Technical Reports: Compilation for First Quarter 1981.
Bibliographic rept. Jan-Mar 81.
May 81, 108p
See also NUREG-0304-V5-N4.

This compilation lists formal regulatory and technical reports issued from January through March 1981 by U.S. Nuclear Regulatory Commission (NRC) staff and contractors. The contents and format of this compilation differ from previous issues in that it is computer produced and includes additional information to make this a more valuable reference tool.

NUREG-0774 PC **A14**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
U.S. Nuclear Regulatory Commission 1980 Annual Report.
Annual rept. no. 6.
17 Mar 81, 321p
See also Annual Rept. no. 5, NUREG-0690.

Contents: Overview; Aftermath of the accident at Three Mile Island; Emergency preparedness; Reactor regulation; Operating experience; Materials regulation and transportation; Domestic safeguards; Waste management; Inspection and enforcement; Cooperation with the states; International cooperation; Standards development; Nuclear regulatory research; Communicating with the public; Proceedings and litigation; Administration and management; Appendices.

NUREG-0778 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
An Assessment of the Failure Rate for the Beltline Region of PWR Pressure Vessels during Normal Operation and Certain Transient Conditions.
Technical rept.,
R. M. Gamble, and J. Strosnider, Jr. Jun 81, 93p

A study was conducted to assess the failure rate for the beltline region of a generic pressurized-water reactor (PWR) pressure vessel. This assessment included the evaluation of several normal operating and transient reactor conditions. Failure rates were calculated from a computer code that used fracture mechanics methods to model the failure process; random number generation techniques were used to simulate random variables and model their interaction in the failure-process. This investigation had three major objectives: (1) to better define the effect of neutron irradiation, material variation, and flaw distribution on the failure rate for the beltline region of PWR pressure vessels, (2) to estimate the relative margins against failure for normal operation and certain transient conditions associated with nuclear pressure vessels, and (3) to evaluate the current limitations for using fracture mechanics models to predict failure rates for nuclear pressure vessels.

PB81-228066 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
Plutonium Recycling in Light Water Reactors: Control and Safety Measures; Stationary Investigations (Plutonium-Rueckfuehrung in LWR: Kontrolle und Sicherheit; Stationaere Untersuchungen (Synthesebericht)).
Summary rept.,
W. Fehrenbach, G. Heiligenthal, and R. Holzer. c1980, 146p EUR-6861-DE, ISBN-92-825-1928-7
Text in German.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The aim of this study was the comparison of the nuclear safety characteristics and performance of LWR with uranium fuel and MOX fuel. For PWR the stationary evaluations include the transitions from the equilibrium U core to equilibrium cores loaded partly and completely with MOX fuel. For BWR the equilibrium uranium cycle and the cycles with 100% and 25% MOX cores were considered. Detailed fuel management calculations show for the MOX cores the same power peaking as for the uranium cores. Altogether, the stationary evaluations for both reactors show no serious problems concerning the plutonium recycling.

WAPD-TM-1386 PC **A05**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Summary of the Hydraulic Evaluation of LWBR (LWBR Development Program).
J. W. Stout, S. Lerner, K. D. McWilliams, and J. R. Turner. Apr 81, 98p
Contract AC11-76PN00014

The principal hydraulic performance features of the Light Water Breeder Reactor are summarized in this report. The calculational models and procedures used for prediction of reactor flow and pressure distributions under steady-state and transient operating conditions are described. Likewise, the analysis models for evaluation of the static and dynamic performance characteristics of the hydraulically-balanced and hydraulically-buffered movable-fuel reactivity-control system are outlined. An extensive test program was conducted for qualification of the subject LWBR hydraulic evaluation models. The projected LWBR hydraulic performance is shown to fulfill design objectives and functional requirements. (ERA citation 06:022042)

18J. Reactor Materials

NUREG/CR-1958 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY

Evaluation of Multiparameter Eddy Current Technology for Inspection of Steam Generator Tubing,
S. D. Brown. Mar 81, 86p BNL-NUREG-51347
Contract DE-AC02--76CH00016
Prepared in cooperation with Battelle Columbus Labs., OH.

Multifrequency/multiparameter eddy current instrumentation for inspection of steam generator tubing has recently become commercially available. The instrumentation offers the steam generator owner a means to conduct parallel tests, i.e., normal tube integrity tests, sludge profiling and dent sizing in one pull through the tube. In addition, the real time suppression of extraneous variables such as support plates, denting and ID noise can be accomplished. The intercontrole 1C3FA multiparameter instrument has been used for an assessment of multiparameter technology to detect and characterize defects in the presence of extraneous variables. A general mixing sequence has been developed which is applicable to both recirculating steam generators (RSG) and once-through steam generators (OTSG). Candidate mixing frequencies have been identified through the use of a computer program which models the 1C3FA sequential mixing network. Using appropriate models of defects at support plates and dented support plates, multiparameter technology has been found to offer advantages over single frequency approaches for more reliable defect detection and characterization.

NUREG/CR-2171 PC **A02**/MF **A01**
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM. Inhalation Toxicology Research Inst.
'In vitro' Dissolution of Respirable Aerosols of Industrial Uranium and Plutonium Mixed-Oxide Nuclear Fuels.
Technical rept.,
Arthur F. Eidson, and James A. Mewhinney. May 81, 21p LMF-79

Dissolution characteristics of mixed-oxide nuclear fuels are important considerations for a prediction of biological behavior of inhaled particles. Four representative industrial mixed-oxide powders were obtained from fuel fabrication enclosures. Studies of the dissolution of Pu, Am and U from aerosol particles of these materials in 0.1 M HCl, and a serum simulant solution showed: (1) dissolution occurred at a rapid rate initially and slowed at longer times, (2) greater percentages of U dissolved than Pu or Am, (3) the temperature history of industrial mixed-oxides did not appreciably alter dissolution rates except when Pu or Am were incorporated into a solid solution by sintering at 1750C, and (4) the serum simulant results agreed with the in vitro behavior of PuO2 and UO2 and 0.1 M HCl results agreed with available in vivo results for inhaled solid solution aerosols. The rapid early dissolution rate was shown to be related to an altered surface layer. Advantages and uses of in vitro solubility data for estimation of biological behavior of inhaled industrial mixed-oxides such as assessing the use of chelation therapy and interpretation of urinary excretion data are discussed. It was concluded that in vitro solubility tests were useful, simple and easily applied to individual materials potentially inhaled by humans.

PB81-216319 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Catalogue of Chemical and Isotopic Nuclear Reference Materials,
Y. Le Duigou. c1980, 46p EUR-6937-EN, ISBN-92-825-2014-5
Prepared in cooperation with Joint Research Center, Geel Establishment (Italy). Central Bureau for Nuclear Measurement.
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The present catalogue is a revised version of the C.B.N.M. report EUR 5229e entitled 'Catalogue of Reference Materials of Interest to Nuclear Energy' (1974). An attempt has been made to give in this catalogue the present status of available chemical, isotopic and trace element reference materials of interest to nuclear energy. Emphasis has been given to the substances of primary interest like those containing uranium and plutonium. In this catalogue the materials are presented according to the sequence of the atomic number of the element of major interest. This inventory, no doubt, includes errors and omissions. An update and completion of the catalogue is foreseen within three years time. (Copyright (c) ECSC-EEC-EAEC, Brussels and Luxembourg,1980.)

PB81-222960 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
The Differential Radiological Impact of Plutonium Recycle in the Light-Water Reactor Fuel Cycle: Effluent Discharges during Normal Operation.
Final rept.,
A. Bouville, P. Guetat, J. A. Jones, G. N. Kelly, and J. Legrand. c1980, 148p EUR-6992-EN, ISBN-92-825-2092-7
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

The radiological impact of a light-water reactor fuel cycle using enriched uranium fuel may be altered by the recycle of plutonium. Differences in impact on the population of the European Communities (EC) from effluents discharged during normal operation are evaluated for the specific case of recycling 10 tons of fissile plutonium metal. The contributions from each stage of the fuel cycle, i.e. fuel fabrication, reactor operation, and fuel reprocessing and conversion, are identified. Separate consideration is given to airborne and liquid effluents, and account is taken of a wide range of environmental conditions, representative of the EC, in estimating the radiological impact. Recycling of plutonium is estimated to result in a reduction in the radiological impact from effluents of about 30% compared with using enriched uranium fuel. (Copyright (c) ECSC-EEC-EAEC, Brussels . Luxembourg, 1980.)

WAPD-TM-1385 PC **A05**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Summary of the Thermal Evaluation of LWBR (LWBR Development Program).
S. Lerner, K. D. McWilliams, J. W. Stout, and J. R. Turner. Mar 80, 78p
Contract AC11-76PN00014

This report describes the thermal evaluation of the core for the Shippingport Light Water Breeder Reactor. This core contains unique thermal-hydraulic features such as (1) close rod-to-rod proximity, (2) an open-lattice array of fuel rods with two different diameters and rod-to-rod spacings in the same flow region, (3) triplate orifices located at both the entrance and exit of fuel modules and (4) a hydraulically-balanced movable-fuel system coupled with (5) axial-and-radial fuel zoning for reactivity control. Performance studies used reactor thermal principles such as the hot-and-nominal channel concept and related nuclear/engineering design allowances. These were applied to models of three-dimensional rodded arrays comprising the core fuel regions. (ERA citation 06:022041)

18K. Reactor Physics

LA-8771-PR PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
Transport and Reactor Theory. Progress Report, October 1-December 31, 1980.
D. J. Dudziak, R. D. O'Dell, and R. E. Alcouffe. Mar 81, 80p
Contract W-7405-ENG-36

Research and development progress in transport and reactor theory by the Los Alamos National Laboratory's Group T-1 for the first quarter of FY 81 is reported. Included are tasks in the areas of Fission Reactor Neutronics, Transport Methods Supporting Research, Reactor Safety Analysis, Fusion Reactor Nucleonics and Special Projects. (ERA citation 06:023540)

PB81-220345 Not available NTIS
National Bureau of Standards, Washington, DC.
Dosimetry Characterization of a Reactor Pressure Vessel Simulator by Fission Chamber and Foil Activation Measurements.
Final rept.,
E. D. McGarry, and A. Fabry. 1980, 11p
Pub. in Proceedings of ASTM-Euratom Symp. Reactor in Dosimetry Methods for Fuels, Cladding and Structural Materials (3rd), EUR6813 EN-FR, II, p1031-1041 1980.

A summary is given of the significance and results of extensive dosimetry measurements in the low-power, Light-Water Reactor Pressure Vessel (RPV) Simulator at the Pool Critical Assembly. Calculated and measured neutron flux and spectral characteristics are compared for a RPV simulator that represents a clean-core calculational model with measured core-power distributions. The purpose of such a model is to validate transport theory computations needed to extrapolate into the pressure vessel dosimetry observations in the surveillance position. Also reported are investigations of the neutron field characteristics of other configurations, which were investigated to establish the design of a high-power RPV simulator to proof test the correlation of metallurgy and dosimetry results.

18N. Snap Technology

LA-8811-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Environmental and Radiological Safety Studies. Interaction of exp 238 PuO sub 2 Heat Sources with Terrestrial and Aquatic Environments. Progress Report, October 1-December 31, 1980.
G. R. Waterbury. Apr 81, 45p
Contract W-7405-ENG-36

The containers for exp 238 PuO sub 2 heat sources in radioisotope thermoelectric generators are designed with large safety factors to ensure that they will withstand reentry from orbit and impact with the earth and safely contain the nuclear fuel until it is recovered. Existing designs have proved more than adequately safe, but the Space and Terrestrial Division of the Department of Energy Office of Advanced Nuclear Systems and Projects continually seeks more information about the heat sources to improve their safety. The work discussed here includes studies of the effects on the heat source of terrestrial and aquatic environments to obtain data for design of even safer systems. The data obtained in several ongoing experiments are presented; these data tables will be updated quarterly. Discussions of experimental details are minimized and largely repetitive in succeeding reports. Compilations of usable data generated in each experiment are emphasized. These compilations include data from environmental chamber experiments that simulate terrestrial conditions, experiments to measure PuO sub 2 dissolution rates, soil column experiments to measure sorption of plutonium by soils, and several aquatic experiments. (ERA citation 06:021691)

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A100 712/9 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.

Thermal and Structural Analysis of Training Round Nose Caps.
Final rept.
M. J. Abbett, Richard P. Duiven, B. Laub, and R. A. S. Beck. May 81, 34p ARBRL-CR-00455, AD-E430 637
Contract DAAG29-76-D-0100
Prepared in cooperation with Acurex Corp., Mountain View, CA. Aerotherm Div.

This report describes the results of a brief computational study using the ABRES Shape Change Code, ASCC-79, to predict the effects of aerodynamic heating on an ablating nose cap configuration for the XM797 high velocity training round. Ablation rates and in-depth thermal response are analyzed for three flight trajectories. Recommendations are made for experimental verification of the computational modeling.

AD-A100 716/0 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
The Effects of C/M Ratio on the Controlled Fragmentation of Cylinders Using External Notching.
David S. Saunders. Dec 80, 34p Rept no. MRL-R-800

The effects of C/M (HE charge to cylinder mass) ratio on the degree of control of fragmentation exerted by external longitudinal notching are investigated. Two series of experiments are conducted. In one series the cylinder wall thickness is varied to induce weight scaling and in the other both the cylinder dimensions and notch pitching are varied to induce number scaling. Although both weight and number scaling with C/M ratio are feasible for notched cylinders, the results demonstrate that there are limitations to the degree of control exerted by the notching. Both weight and number scaling appear to be limited by the propensity for the operation of natural fragmentation mechanisms between the notches and weight scaling is also limited by geometric factors. The filling of the notches with an epoxy resin produces an increase in the degree of control of fragmentation for both weight and number scaling cylinders. (Author)

AD-A100 723/6 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
A Consumable Case for Artillery Systems.
Memorandum rept.,
J. J. Rocchio, C. R. Ruth, I. W. May, K. J. White, and I. Nadel. Mar 81, 72p ARBRL-MR-03086, AD-E430 630

The inherent lack of rigidity and the complexity of bagged propelling charges and the associated ignition components can lead to incorrect alignment and/or assembly of the charge. A well-designed consumable case can alleviate these problems by assuring ignition system alignment and control of charge location within the chamber while simplifying the fabrication of the charge. A howitzer prototype consumable case was fabricated from available felted nitrocellulose components and test firings were conducted. Three types of ignition systems were tested: a base pad and centercore snake of black powder (as used in the M203 Propelling Charge), a centercore snake alone (113 g Class 5 black powder), and an igniter constructed of 113 g of Class 5 black powder placed in three 1-cm diameter plastic tubes within the centercore tube. The results indicated: 1) the consumable case gave performance comparable to the M203 charge; 2) the base pad/snake igniter gave larger pressure waves than the two types of centercore igniters alone; 3) the igniter system based upon the plastic tubes gave the best performance; and 4) there was no significant increase in residue with the consumable case. The rigidity of a consumable case and the precision of the manufacturing process should eliminate the persistent problems (e.g., ignition delay, pressure waves, velocity variation, etc.) which are the result of the misalignment of critical ignition train components and poor tolerances inherent to bagged charges. Therefore, major benefits of a consumable case should be improved safety and precision as well as good automatic handling and loading characteristics.

AD-A100 724/4 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Measurements of Dynamic Stress and Strain Components in Targets Struck by Penetrators.
Memorandum rept. Jun 77-Jun 79,
Dennis S. Pritchard. Mar 81, 34p ARBRL-MR-03095, AD-E430 621

Stress and strain profiles have been recorded in targets impacted by long-rod kinetic-energy projectiles. Stress gauge records were strongly influenced by the strain field in the target, so compensating strain measurements were used to derive the correct stress profile. Strain-compensated stress gauges in the projectile path measured stress which increased to a value that remained nearly constant until penetration neared the gauge. This constant stress was close to the value of the Hugoniot Elastic Limit of the target material.

AD-A100 726/9 PC **A04**/MF **A01**
Whittaker Corp., North Hollywood, CA. Shock Hydrodynamics Div.
Measurement of Critical Diameter, Shock and Impact Sensitivity of a Special Propellant.
Final rept. Jan 78-May 79,
W. H. Andersen, D. L. Aldrich, Frieda L. Gillespie, G. P. Stillman, and Jan Y. Wong. Mar 81, 60p 3460-12, ARBRL-CR-00448, AD-E430 634
Contract DAAK11-78-C-0019

The results of an experimental investigation of the critical diameter, and shock and impact sensitivity of the LOVA-X1A propellant are described. The detonation velocity was determined as a function of charge diameter for the propellant. The critical diameter lies between 0.245 and 0.375 in. for the bare charge. The shock sensitivity for initiating detonation in the propellant was determined by a gap test technique. The results, together with the results of projectile impact tests on solid disks of the propellant determined earlier, are discussed and examined in terms of the sensitivities of materials given in the literature. The critical initiating shock pressure and critical ignition energy are estimated. It is shown that the LOVA-X1A propellant is relatively insensitive to initiation compared to most cast explosives and propellants in use today. The sensitivity of stacked small grains of the propellant to projectile impact was also determined. The tests showed that the response of the grains at a large projectile diameter was always deflagration; whereas at small diameters no sustained reaction was produced. No detonation was produced by the impact. Recommendations for additional studies are given.

AD-A100 728/5 PC **A04**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Measurement of Pressure and Related Energy Output from Thermally Ignited Pyrotechnic Compositions Burning in a Partially Vented Vessel.
Technical rept.,
Patricia L. Farnell, Leroy Hunter, and Francis R. Taylor. May 81, 70p ARLCD-TR-81006, AD-E400 621

In an effort to determine the hazards of preparing pyrotechnic compositions in processing bays, a study was conducted in which a series of compositions were thermally ignited in a vented vessel and the resulting pressure versus time, rate of pressure rise, and velocity of the air pressure wave were measured. The compositions were a standard illuminating material, a photoflash powder, an igniter, a delay powder, and a formulation which generates IR radiation. These experiments showed that the pressure increased linearly with (a) increasing loading density for a constant vent, and (b) decreasing vent size for constant loading density. For the linear part of the pressure-time trace, rate of pressure rise also increased with increasing loading density and with decreasing vent size. This latter result shows the effect of pressure on burning rate. Velocities of the air pressure wave were obtained in excess of the speed of sound, indicating a low velocity detonation had taken place. Very low TNT equivalences for pressure were obtained, the largest being only 0.61; those for impulse were 0.6 through 0.9 with the smallest vent for the compositions (except the gasless delay powder which was only 0.05), reflecting the relatively long duration of positive pressure produced by these compositions.

AD-A100 729/3 PC **A03**/MF **A01**
Hazards Research Corp., Denville, NJ.
Classification of Liquid Gun Propellants and Raw Materials for Transportation and Storage.
Contract rept.,
William J. Cruice. May 81, 40p ARBRL-CR-00454, AD-E430 636
Contract DAAK11-78-C-0024

Nine materials have been tested and classified on the basis of the military explosive classification system as described in Department of the Army Technical Bulletin C1, TB 700-2. Since the test methods described in TB 700-2 are designed for solids, rather than liquids, a test program was designed in which nine tests (relating specifically to unique problems and situations encountered in the liquid phase) were substituted for the specified TB 700-2 tests. Where the originally proposed tests were considered to be overly rigorous, additional tests were performed to better simulate the TB 700-2 protocol. Concordance of the tests with those described in TB 700-2 was described, and a testing protocol was developed. This protocol was applied to the classification of the nine materials and each material was classified according to the TB 700-2 classification scheme. The three fuels (IPAN, TMAN, TEAN) and the three oxidizers (HAN 2.8 M, 11 M, 13 M) were considered unrestricted under TB 700-2; LGP 1776, LGP 1845 and NOS 365 were classified Military Class 3 (DOT Class B).

AD-A100 752/5 PC **A04**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
U.S. (ARRADCOM) Test Results for NATO Round-Robin Test on High Explosives.
Technical rept.,
L. Avrami, and M. S. Kirshenbaum. May 81, 59p ARLCD-TR-81010, AD-E400 628

As part of the NATO Round-Robin Test program using explosives from one source, the US (ARRADCOM) performed a series of tests on five BICT-furnished explosives. The explosives tested were PETN, RDX, HMX, tetryl and TNT. A series of impact tests were conducted utilizing the 50% Bruceton, the Picatinny Arsenal 10% point and the full run-down test methods. Additional tests, including melting point, chemical analysis, vacuum stability test, explosion temperature, DTA/TGA, DSC, IR, NMR and particle size distribution, were conducted. For impact sensitivity and thermal sensitivity, relative rankings for the explosives were determined.

AD-A100 753/3 PC **A02**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
An Order Statistic Approach to Fuze Design.
William E. Baker, and Malcolm S. Taylor. Apr 81, 25p ARBRL-TR-02313, AD-E430 623

If X sub 1, X sub 2 ..., X sub n are independent, identically-distributed random variables, then Y sub 1 $<$ Y sub 2 $<$ ... $<$ Y sub n, where the Y sub 1's are the X sub 1's rearranged in order of increasing magnitudes, are defined to be the order statistics corresponding to the original random sample. Order statistics have been applied to the solution of a problem involving the determination of time windows for firing impulses in a fuzing system. A computer program has been written which provides the probability of a warhead fuzing as a function of the parameters which characterize the detonators. Conversely, given a required probability of fuzing, the program will determine the necessary detonator characteristics. Although motivated by this specific problem, the work is general in nature and should have additional applications in the armament research and development community.

AD-A100 798/8 PC **A07**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Helicopter and Cable Drop Tests of a Multi-Sensor Yawsonde Instrumented SADARM Model.
Final rept.,
V. Oskay, and W. H. Mermagen. Mar 81, 127p
ARBRL-MR-03088, AD-E430 629
Supersedes Rept. no. ARBRL-IMRT-670.

A series of helicopter and cable drops of a yawsonde-instrumented SADARM model was designed to determine the flight behavior of the parachute/warhead system under conditions which would resemble both a real flight environment and a feasibility firing environment. About ninety percent of the helicopter and cable drops resulted in successful deployment of the vortex-ring parachute and proper operation of the system. Tests with the 2.13-metre parachute show that steady-state spin is achieved about four seconds after release for both cable and helicopter drops. The average spin rate observed with this parachute is 4.7 rps + or - 0.1 rps. The yawsonde results showed that this particular model/parachute combination has a bi-modal yaw behavior. The slow mode has a frequency equal to the pendular frequency of the system (about 1.0 Hz). This mode seems to be excited by external forces such as wind shear. The fast mode has a frequency about equal to the steady-state spin rate (about 4.8 Hz) and this mode appears to be excited by the dynamics of the parachute/payload system. The fast mode does not appear to be damped. From the yawsonde data, the amplitude of yaw seems to be about 5.0 degrees. Use of 1.83-metre parachute and smaller torque disk with this payload appears to increase the duration of the transitional time to about 7.5 seconds. Also, the average value of the steady-state spin is increased to 6.0 rps. The bimodal behavior of the system remains unchanged although with the smaller parachute the frequency of the fast mode is increased to about 6 Hz. The slow mode remains unchanged.

AD-A100 952/1 PC **A02**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Static Loading of the TM-46/MVM Mine-Fuze Combination.
Final rept.,
George A. Coulter, George T. Watson, and James H. Patrick. Mar 81, 22p Rept no. ARBRL-TR-02305
Contract MIPR-N61331-80-MP-D0012

A method is described for loading the irregular sensitive surface of an antitank mine. An example is given for the TM-46/MVM mine-fuze combination. The top surface deflection is measured by means of an optical follower during the time of the static air load application. A load-deflection curve is given for the TM-46/MVM. (Author)

AD-A100 964/6 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Soft Recovery Tests of a 155-mm Cannon Launched Guided Projectile Warhead, Type T.
Memorandum rept.,
James W. Evans, Carl R. Ruth, and Emerson V. Clarke, Jr. May 81, 43p Rept no. ARBRL-MR-03107

The launch and recovery portion of a launch survival test on a Type T, 155-mm Cannon Launched Guided Projectile (CLGP) warhead was conducted. This test employed the Large Caliber Soft Recovery System (LCSRS). The warhead body was adapted for this test by attaching a forward water scoop and a base structure. These components were necessary for launch from a 155-mm howitzer and recovery in the LCSRS. The projectile system was instrumented with a FM/FM telemetry system to measure base pressure, projectile acceleration, and strains on the inner wall of the warhead. Three instrumented, CLGP-warhead, test projectiles were fired from a 155-mm, M185 Howitzer tube using an M4A2, Zone 7, Propelling Charge. Telemetry data were received from all three and they were successfully recovered in the LCSRS. (Author)

AD-A101 109/7 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Functioning Time of Air-Burst Fuzes.
Final rept. on test operations procedure.
1 Jun 81, 14p Rept no. TOP-4-2-808
Supersedes Rept. no. MTP-4-2-808 dated 30 Apr 68, AD-717 077.

This TOP describes procedures for measuring the elapsed time between the instant of firing (time zero) and the air-burst of a fuzed warhead. Weapon firing conditions such as elevation, zone, temperature, and sample size are covered in TOP 4-2-055.

AD-A101 148/5 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
STAR - Copperhead Interface.
Master's thesis,
Thomas Everett Cahill. Mar 81, 93p

This thesis provides the general design logic for a computer representation of the Field Artillery's precision guided munition- Copperhead. The design has been specifically structured to enable its integration into the Simulation of Tactical Alternative Responses (STAR) Model. (STAR is a stochastic force-on-force combat simulation.) Routines and events are developed which portray the target identification, target selection, firing, and impact phases of the Copperhead system. Interface points of the new logic with the current STAR model are identified and the modifications required to support the new system are discussed. Also presented is an overview of STAR's current Field Artillery module. Key Copperhead system characteristics which influence the model are also described. (Author)

AD-A101 163/4 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Combustion Processes in Consolidated Propellants.
Memorandum rept.,
Ingo W. May, and Arpad A. Juhasz. May 81, 41p Rept no. ARBRL-MR-03108

The use of consolidated or compacted conventional gun propellants offers the ballistician the opportunity for significant performance increases through effective use of very high loading densities on the order of 1.2 g/cc. Such loading densities will only be effective, however, if accompanied by an increase in surface area progressivity. We report the results of an experimental program surveying the effects of ignition stimulus and compaction density on the combustion of simple wafers of consolidated charges of single and double base propellants. We have found that sample confinement, surface inhibition, and grain geometric factors, have significant effects on charge break-up and propellant mass burning rate. In effect, the samples can behave with strong surface area progressivity. With a knowledge of the base grain propellant linear burning rate, independently arrived at, we have extracted instantaneous surface area profiles for burning consolidated propellants. The progressive character of the gas generation rate from burning consolidated charge samples can be explained on the basis of 'macroscopic progressivity' defined as the controlled release of surface area through a continuous deconsolidation process.

AD-A101 188/1 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Extreme Value Quantal Response Experimental Design.
Technical rept.,
Jill H. Smith, and Jerry Thomas. May 81, 32p Rept no. ARBRL-TR-02325

An experimental design has been developed to be used to determine the shielding thickness required between rounds stored in a storage area to prevent round-to-round propagation from an initial explosion. Extreme value quantal response techniques were used with shielding thickness as the stimulus variable. The development design drastically reduces the sample size required for a given probability and confidence when compared with known distribution-free extreme value designs. (Author)

AD-A950 563/7 PC **A02**/MF **A01**
Watertown Arsenal Labs., MA.
Magnetic Inspection of Projectiles by Induction Techniques.
Technical rept.,
Patrick C. McEleney, and Vincent H. Early. Nov 59, 24p Rept no. WAL-TR-145/18

No abstract available.

DE81024055 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Numerical Calculation of Shock-to-Detonation from Projectile Impact.
J. H. M. Fu, and G. E. Cort. Apr 81, 14p LA-8816-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

The results are described of some numerical calculations of the impact of steel cylinders and spheres on the plastic-bonded high explosive PBX 9501. The calculations were carried out by a reactive, multicomponent, two-dimensional, Eulerian hydrodynamic computer code, 2DE. The 2DE computer code is a finite-difference code that uses the donor-acceptor-cell method to compute mixed cell fluxes. The mechanism of shock initiation to detonation in heterogeneous explosives is best described as local decomposition at hot spots that are formed by shock interactions with density discontinuities. The liberated energy strengthens the shock so that as it interacts with additional inhomogeneities, hotter hot spots are formed, and more of the explosive is decomposed. The shock wave grows stronger until a detonation begins. This mechanism of initiation has been described numerically by the Forest Fire burn model, which gives the rate of explosive decomposition as a function of local pressure. The parameters in the Forest Fire burn model have been developed from experiments where the induced shock approximates a plane wave and are applied here to a situation where the induced shock is a divergent wave with curvature that depends on the size and shape of the projectile. The calculated results have been compared with results from experiments involving instrumented mock and live high explosives, with projectiles of varying sizes, shapes, and velocities. Good agreement between the calculated and experimental data was found. (ERA citation 06:024109)

LA-UR-81-1067 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Detonation Pressures of PBX-9404, Composition B, PBX-9502, and Nitromethane.
W. C. Davis, and J. B. Ramsay. 1981, 9p CONF-810602-25
Contract W-7405-ENG-36
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

Measurements of detonation pressure for PBX-9404, Composition B, PBX-9502, and nitromethane are presented. The interpretations of the data are discussed, and the implications are compared with results from other experiments. The pressures are considered from the point of view of their use as calibrations for calculations, and suggestions are given for slight changes from the measured value for use with limited calculation procedures. (ERA citation 06:022523)

LA-UR-81-992 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Manufacture of Triaminotrinitrobenzene.
T. M. Benziger. 1981, 16p CONF-810712-1
Contract W-7405-ENG-36
Annual conference on chemical and mechanical technologies of propellants and explosives, Karlsrube, F.R. Germany, 1 Jul 1981.

Process studies were made on the preparation of triaminotrinitrobenzene (TATB), an explosive of unusual insensitivity and high thermal stability. Reaction conditions and procedures were determined that allowed its practical manufacture in batch reactors on a 200-kg scale. (ERA citation 06:022522)

N81-26595/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Type of Explosives and Physical-Mechanical Properties of Explosive Rock on Formation of Toxic Gases in Atmosphere of Shafts.
E. O. Mindeli, and M. Y. Khudyakov. Feb 81, 8p
NASA-TM-76549
Contract NASW-3198
Transl. Into English from Vzryvnoye Delo (USSR), No. 72, 1973 p 147-150. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The quality of toxic gases formed during explosive work in underground shafts depends upon the type of explosives and the conditions of explosion. Several types of explosives and rocks were examined. All remaining conditions were maintained the same (sandy-argillaceous stemming, electrical method of explosions, diameter of blast holes, and the direct triggering of charges).

PAT-APPL-6-244 380 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Delay Cartridge with Temperature Programmed Flash Chamber.
Patent Application,
Michael L. Greene, and Frank J. Valenta. Filed 16 Mar 81, 12p AD-D008 553/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved pyrotechnic delay system is given wherein temperature compensation means are utilized to minimize or eliminate ambient temperature affects upon the burning rate and variability of the delay. Apparatus and method are provided to increase the accuracy of cartridges employing pyrotechnic delay compositions by decreasing differences in composition burning time between extreme ambient temperatures. In the apparatus and method, a flash chamber is programmed to increase in volume during initiation of the delay column at elevated temperatures to increase the accuracy of cartridges employing pyrotechnic delay compositions. (Author)

PAT-APPL-6-244 434 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Catalysts for Nitramine Propellants.
Patent Application,
Robert A. Fifer, and James E. Cole. Filed 16 Mar 81, 9p AD-D008 540/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Small amounts of metal tetrahydridoborohydrides, e.g. as low 1% by weight of the nitramine, are effective for increasing the burning rate of nitramine propellants. Excellent results can be obtained by employing the metal tetrahydridoborohydrides in an amount of about 10% by weight of the nitramine component, whereby burning rates several times higher than that obtained with the unmodified propellant are obtained. Amounts of such metal tetrahydridoborohydrides up to 20% or more by weight of the nitramine are also effective to increase the burning rate of nitramine propellants; however, the use of such larger amounts is less desirable since it reduces the proportion of nitramine and hence the enrgy output of the propellant.

PAT-APPL-6-262 351 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Projectile Carrier for Liquid Propellant Gun.
Patent Application,
William L. Black, and Kenneth L. Moore. Filed 11 May 81, 13p AD-D008 546/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention concerns an improved round for use in liquid propellant guns. The improved round comprises a projectile attached to a carrier which is shaped like an abbreviated cartridge case. The carrier has a plurality of injection ports that communicate to an expandable volume. Sealing means prevent the escape of liquid propellant from the expandable volume which upon injection causes the projectile to be pumped to a forcing cone leaving the carrier behind. Several ignition means are used employing Boxer, Berdan or electric primers. (Author)

PATENT-3 994 232 Not available NTIS
Department of the Army, Washington, DC.
Pneumatic Match through Use of a Conical Nozzle Flare.
Patent,
Edward L. Rakowsky, Vincent P. Marchese, Robert H. Page, and Anthony P. Corrado. Filed 22 Aug 75, patented 30 Nov 76, 4p AD-D008 543/1, PAT-APPL-606 816
Supersedes PAT-APPL-606 816-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved pneumatic match utilizes a vented conically shaped nozzle flare positioned in a downstream region of a convergent nozzle to permit the match to be used in applications where fast functioning time is a necessity and where the fluid activating medium comprises a low helium pressure source or only high pressure air. (Author)

PB81-216053 PC **A02**/MF **A01**
IDL Chemicals Ltd., Hyderabad (India).
A C Firing Ability of Detonation.
Final rept.,
V. Arasu, P. Satyavratan, and R. Vedam. 14 Dec 80, 21p IDL/R/D-80

This paper essentially analyses the series firing ability of detonators when subjected to AC mains voltage. The analysis and conclusions are made based on actual experiments conducted with the help of a custom built Electronic Firing system. At lower currents there exists a narrow band of critical starting angles at which misfires occur. This critical zone is explained based on a hypothesis of desensitization of the fusehead by the current flowing during the falling slope region. This phenomena is less severe at higher currents. A suitable device was developed to fire the detonators which eliminates misfires under AC mains voltage firing.

PB81-217465 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Plastic Bonded Explosives. II. PBX with Polyamide Binder (Plastbundna Spraengaemnen. II. PBX med Polyamid som Bindemedel),
Hugo Berg. Sep 80, 50p FOA-C-20371-D1
Text in Swedish, Abstract in English.

Existing methods for producing plastic bonded explosives with polyamides are examined. A literature survey is then presented on the solubility of various polyamides. Finally, a method is reported for producing molding powder for plastic bonded explosives using a mixture of RDX/polyamide at a 90/10 ratio. Two different polyamides are examined. The investigations show that polyamide can be used as a binding agent to agglomerate a fine crystalline explosive to form larger granules that can be used as molding powder for producing PBX with an explosive/polyamide ratio of 90/10. The slurry technique was used to produce the molding powder, although the process was varied somewhat depending on the polyamide used. The two polyamides examined as binders are Elvamide 8061 and Ultramid 1 C. In the former case methanol is used as the solvent and in the latter case methanol is mixed with water at a ratio of 80:20. The choice of coloring agent was shown to affect the properties of the finished molding powder and the yield. Since no suitable mold was available, the powder has not yet been molded into charges. A colorimetric method has been developed for the quantitative determination of RDX in the presence of Ultramid 1 C.

UCRL-84990 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Modeling Two-Dimensional Shock Initiation and Detonation-Wave Phenomena in PBX 9404 and LX-17.
C. M. Tarver, and J. O. Hallquist. 15 May 81, 12p CONF-810602-29
Contract W-7405-ENG-48
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

The ignition and growth concept of reactive flow in heterogeneous solid explosives is incorporated into a two-dimensional, finite element, Lagrangian code and used to model shock initiation and detonation wave propagation experiments on PBX 9404 and LX-17. The failure radii and corner turning abilities of detonating PBX 9404 and LX-17 are calculated. Two-dimensional shock initiation experiments on LX-17 which produce both failing and diverging detonation waves are accurately simulated. (ERA citation 06:024111)

UCRL-85001 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Modeling Studies of the Performance Characteristics of Composite Explosives.
C. Westmoreland, and E. L. Lee. May 81, 7p CONF-810602-26
Contract W-7405-ENG-48
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

A model for the initiation and detonation of composite explosives is proposed which considers both monopropellant and fuel-oxidizer reactions. This reactive model has been incorporated into an Eulerian hydrocode and used to simulate experimental results on composite explosives. The model accounts for variations in composition without the need to readjust rate parameters for each new mixture studied. A limited comparison shows that the calculated failure diameter as a function of composition is in reasonable agreement with experimental results. Calculations of idealized, representative systems indicate that a two-mode detonation behavior is unlikely, since the components interact strongly through the pressure dependent deflagration rate law. The calculations also show that either large transport coefficients or very small particle sizes are required to extract the energy of fuel-oxidizer mixtures in time to contribute effectively to explosive performance. (ERA citation 06:024112)

UCRL-85016 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Energy Flow in High Speed Perforation and Cutting.
M. van Thiel. 7 Oct 80, 17p CONF-8010185-1
Contract W-7405-ENG-48
31. Aeroballistic Range Association conference, Pasadena, CA, USA, 7 Oct 1980.

It is demonstrated that effects of long rod penetrators on targets can be modeled by introducing a high pressure (energy) column on the penetration path in place of the projectile. This energy can be obtained from the kinetic energy of the penetrator; the equations of state of the materials used and a Bernoulli penetration condition. The model is supported by detailed hydro calculations. (ERA citation 06:022432)

UCRL-85034 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Postdetonation Behavior of Condensed High Explosives by Modern Methods of Statistical Mechanics.
F. H. Ree. May 81, 11p CONF-810602-27
Contract W-7405-ENG-48
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

An a priori theory of statistical mechanics was recently used to compute the thermodynamic properties of N sub 2 , O sub 2 , CO sub 2 , and H sub 2 O. In this paper, the a priori theory, together with the one-fluid van der Waals mixture model is used to compute postdetonation properties of three different high explosives - liquid NO, RX-23-AB, and hexanitrobenzene (HNB). The results show satisfactory agreement with the experimental Chapman-Jouguet (C-J) data and the C-J expansion adiabat deduced from the cylinder test data. By comparing the results with experimental data and with results obtained from the Jacobs-Cowperthwaite-Zwisler 3 (JCZ3) equation of state and the Becker-Kistiakowsky-Wilson (BKW) equation of state, it is demonstrated that the a priori theory is superior to the two semi-empirical models. The adiabatic gamma, -(par. delta lnP/par. delta lnV)/ sub s/, predicted from the a priori theory decreases uniformly with the volume expansion. Analysis of the shock-wave data of liquid CO indicates that carbon atoms condense into a diamond-

like structure rather than a graphitelike structure, as is assumed by current postdetonation models. (ERA citation 06:024113)

19C. Combat Vehicles

AD-B052 408/2 PC **A03**/MF **A01**
Army Transportation School, Fort Eustis, VA.
Tactical Wheeled Vehicle Fleet Requirements. Volume I. Executive Summary.
Final rept. on Phase 1.
Oct 80, 43p
See also Volume 2, AD-B052 409L.
Distribution limitation now removed.

THe study was to accomplish the following objectives: determine the payload categories and types of tactical wheeled vehicles which would best meet the needs of the Army; prepare an acquisition program to include specification of the number, type, and cost of vehicles required to transition from the existing fleet to the preferred fleet; develop an implementation schedule to align current requirements document's Table of Organization and Equipment/Basis of Issue Plans (TOE/BOIP) with study results.

AD-B052 409/0 PC **A05**/MF **A01**
Army Transportation School, Fort Eustis, VA.
Tactical Wheeled Vehicle Fleet Requirements. Volume II. Main Report.
Final rept. on PHase 1.
Oct 80, 93p
See also Volume 3, AD-B052 410L.
Distribution limitation now removed.

This is a Department of Army directed study designed to answer the question on tactical wheeled vehicle fleet composition and requirements as posed by the House Appropriations Committee of the United States Congress. The methodology used the automated procedures established throughout the Army for defining requirements and developing procurement programs. These procedures are applied to eight alternative vehicle fleets and the results are compared to a base case to establish the preferred alternative. (Author)

AD-B052 410/8 PC **A99**/MF **A01**
Army Transportation School, Fort Eustis, VA.
Tactical Wheeled Vehicle Fleet Requirements. Volume III. Appendixes.
Final rept. on Phase 1.
Oct 80, 606p
See also Volume 1, AD-B052 408L.
Distribution limitation now removed.

Contents: Study Directive; Study Plan; Proponent Summaries of Toe Analysis; Alternative Data Summaries; Off-Line Analysis of Ammunition and POL Requirements for Armor, Artillery and Mechanized Infantry Battalions; Wartime Active Replacement Factors (WARF); Development Costs-Constant FY 82 Dollars (Thousands) Alternatives 1-9; Development Costs - Current Year Dollars (Thousands) Alternatives 1-9; and Driver Costs - Current Year Dollars (Millions) Alternatives 1-9.

19D. Explosions, Ballistics, and Armor

AD-A100 713/7 PC **A02**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Chemical Systems Lab.
A Mathematical Model of the Probability of Perforation of the Human Skull by a Ballistic Projectile.
Technical rept. Oct 78-Aug 80,
Larry M. Sturdivan, and Roy Bexon. Apr 81, 23p ARCSL-TR-81001, AD-E410 420

A mathematical model for the probability of penetration of the unprotected human skull is presented which relates the energy of the projectile to the properties of the skull. The model is specifically for steel spheres and cubes but can be used for other projectile shapes or densities provided that care is taken. Constants are obtained for the probabilistic model which allow calculation of the probability of penetration or, conversely, the velocity for a given probability of penetration for a given projectile/skull thickness combination.

AD-A100 725/1 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Radio Frequency Oscillator Technique for Monitoring Velocity and Structural Integrity of Projectiles during Their Exit from the Muzzle.
Memorandum rept.,
Rurik K. Loder, and Jimmy Q. Schmidt. Apr 81, 36p ARBRL-MR-03100, AD-E430 632

Accurate knowledge of projectile velocity and integrity at muzzle exit is requisite to many aspects of research, development, product assurance, quality control, and field employment of projectile-gun systems. Standard methods for obtaining such information have severe limitations of applicability. As a result of a recent thrust program in the technology area of projectile-gun dynamics, a radio frequency oscillator technique has been developed and successfully tested for the 105mm M68 tank gun system. It provides real time measurement of projectile exit from the muzzle and, hence, projectile muzzle velocity. The electronic pulse associated with the measurement can also be used to trigger auxiliary instrumentation such as x-ray pulses and photographic cameras and to automatically adjust the corresponding delay times to the correct projectile muzzle velocity.

AD-A100 751/7 PC **A10**/MF **A01**
Gough (Paul) Associates, Inc., Portsmouth, NH.
A Two-Dimensional Model of the Interior Ballistics of Bagged Artillery Charges.
Final rept. Jun 79-Jan 81,
Paul S. Gough. Apr 81, 208p PGA-TR-81-1, ARBRL-CR-00452, AD-E430 635
Contract DAAK11-79-C-0071

A theoretical model is described for digital simulation of flamespreading and pressure wave propagation in a single bag artillery charge. The theory is based on a numerical solution of the balance equations for unsteady, two-dimensional, axisymmetric, heterogeneous, reacting, two-phase flow. Flamespreading through bag charges is known to be influenced strongly by details of the ullage which initially surrounds the bag and by the behavior of the bag material itself. Accordingly, an explicit representation is made of the region occupied by the propelling charge at any time. The flow in the ullage, which surrounds the region occupied by the propellant, is represented as unsteady, inviscid and single-phase. The method of solution is illustrated by reference to the complete interior ballistic cycle of a top-tone 155-mm howitzer charge.

AD-A100 900/0 PC **A02**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
Shock Development Prior to Detonation in Shaped Layered Nonlinear Elastic Media with Stochastic Variability.
Final rept.,
Alan Jeffrey. 29 Aug 80, 3p AFOSR-TR-80-1083
Contract F49620-79-C-0150

The objective of this work was to examine the way in which an acceleration wave propagates in a randomly layered nonlinear medium in which the material constants vary stochastically from layer to layer. Furthermore the problem, although formulated as a one-dimensional configuration, was modified to describe propagation in a bar in which there is a slowly changing cross-sectional area. Thus the analysis may be applied to formed charges which have an axis of symmetry and a slowly varying cross-section normal to that axis.

AD-A100 963/8 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Trajectory Simulation Input Data for the 20mm, M56A3 Projectile Fired from a Helicopter.
Final rept.,
Joseph W. Kochenderfer. May 81, 29p Rept no. ARBRL-MR-03104
Supersedes Rept. no ARBRL-IMR-646.

Aerodynamic and trajectory simulation input data for the 20mm, M56A3 projectile suitable for use in six degree of freedom and modified point mass models are presented. Comparison is made between models, and the added complexity introduced by firing from a helicopter is discussed. Limitations on use of the ballistic parameters to various flight conditions are outlined. (Author)

AD-A100 965/3 PC **A05**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Quantitative Assessment of Pressure Waves in Guns.
Technical rept.,
A. W. Horst, F. R. Lynn, and J. N. Walbert. May 81, 87p Rept no. ARBRL-TR-02319

Combustion instability in conventional guns is often manifested by the presence of longitudinal pressure waves traveling between the breech face and base of the projectile. Such waves are of concern because of their causal connection with high chamber pressures and pressurization rates which may in turn lead to breechblows, projectile or fuze malfunctions, and ballistic variability. While design approaches which minimize pressure waves are routinely employed today, the problem remains of specifying acceptable pressure-wave levels. This study addresses the establishment of the basis for an improved procedure for assessment of pressure waves. Several techniques are described for detecting the true pressure-wave signal from its carrier by removing what is essentially the classical Lagrangian pressure gradient from the experimental pressure-difference-versus-time profile, formed by subtracting the pressure-versus-time signal recorded at the forward end of the chamber from that recorded at the breech. The most successful approach is shown to be a digital Fourier-analysis technique involving multiple bandpass filtering of the recorded pressure-difference-versus-time profile. The resulting pressure-wave signal is characterized by an initial amplitude which is believed to be a physically well-motivated measure of the level of pressure waves and which offers procedural advantages in terms of both measurement and statistical processing of data. Integration of this technique into existing safety-assessment procedures is outlined.

PAT-APPL-6-248 642 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Gun Mounted Armor Applique.
Patent Application,
James E. Shields. Filed 27 Mar 81, 10p AD-D008 535/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a device which causes the premature activation of a shaped charge warhead, and more specifically, to an armor applique which causes shaped charge initiation to occur while the warhead is at a standoff distance from the protective armor.

19F. Guns

AD-A100 960/4 PC **A06**/MF **A01**
Litton Systems, Inc., Sunnyvale, CA. Mellonics Systems Development Div.
Adequacy of M16A1 Rifle Performance and Its Implications for Marksmanship Training.
Research rept.,
Arthur d. Osborne, John C. Morey, and Seward Smith. Sep 80, 109p ARI-RR-1265
Contract DAHC19-77-C-0011

This document records firing test results for typical M16A1 rifles, providing data for simplified and improved marksmanship training procedures. Sixty rifles were selected at random and subjected to bench-type serviceability checks and accuracy

firing tests. Following initial testing, a representative sample (good, average and bad) of nine rifles was selected for the following tests: zero procedures, zeroing with the long range sight, trajectory, rimfire adapter, effects of barrel stress, firer error and firing by initial entry soldiers. This document is intended for marksmanship training developers and proponents of marksmanship hardware items. It should also be of value to those who want to become more knowledgeable about the capabilities of the M16A1 rifle. (Author)

AD-A950 696/5 PC **A02**/MF **A01**
General Steel Castings Corp., Eddystone, PA.
Special Alloy Ingots for Gun Tubes.
Final rept.,
Clyde B. Jenni. 12 May 54, 22p WA-310/186
Contract DA-36-034-ORD-1513
Supersedes AD-031 910.

No abstract available.

DE81025008 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Electromagnetic theta Gun and Tubular Projectiles.
T. J. Burgess, E. C. Cnare, W. L. Oberkampf, S. G. Beard, and M. Cowan. Dec 80, 58p SAND-80-1988
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Unlike the better known rail gun, the theta gun applies the propelling force along the length of its projectile. This is shown to allow much greater acceleration of high fineness ratio projectiles for a given barrel pressure, allowing much shorter barrels for military applications. A computer code which simulates performance of the theta gun is described and experimental results from a few simple, low energy experiments show close agreement with code predictions. Trajectories and aerodynamic heating for three candidate military projectiles are calculated for vertical and horizontal atmospheric launches where initial velocity is as high as 3 km/s. The calculations indicate that in some cases a thin layer of heatshield (ablator) will be required to control projectile heating. (ERA citation 06:024010)

PAT-APPL-6-243 017 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Fluidic Recoil Buffer for Small Arms.
Patent Application,
Michael Goes. Filed 12 Mar 81, 15p AD-D008 541/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A weapon is provided with means to buffer the recoil which is produced when the weapon is fired. The buffer includes a fluidic device having a first and second chamber. During recoil, a compressive force is applied to the fluid in the first chamber, and flow from the first chamber to the second chamber is restricted by a fluidic diode in relationship to the pressure differential between the first and second chamber. On counter recoil, the fluid flows from the second chamber to the first chamber in an essentially unrestricted manner. The level of flow restriction by the fluidic diode is greater at high pressure differentials than at low pressure differentials. (Author)

PB81-218810 PC **A04**/MF **A01**
Miljoestyrelsen. Copenhagen (Denmark).
Noise from Firing Ranges (Stoej fra Skydebaner).
Aug 79. 75p VEJLEDNING-2/1979, ISBN-87-503-3016-0
Text in Danish, abstract in English.

Noise from firing ranges constitutes a unique form of noise pollution, to which regulations govering typical industrial noise are difficult to apply. For this reason, and because of an increasing number of compliants from people residing near firing ranges, the Environmental Protection Office appointed a committee in January 1976 to examine problems involved in the establishment and operation of firing ranges. The present work describes the findings of this committee. Various types of ranges are described, the major categories being trapshooting ranges and fixed-target ranges. Each category has its own unique problems. Noise measurement units and devices are briefly described. Noise levels at various distances for various categories of guns from gallery pistols to machine guns are listed. Patterns for the spreading of noise under various wind conditions are described and methods of preventing the spread of noise including vegetation, dirt mounds, and screens are presented with respect to the various types of ranges. Environmental aspects of firing ranges other than noise pollution are also discussed. Lead shot, for example, may be ingested by birds and several cases are known in which swine have been poisoned by ingesting fragments from clay pigeons. Sample permits and complaints are presented in the appendices.

20. PHYSICS

20A. Acoustics

AD-A100 633/7 PC **A04**/MF **A01**
MAR, Inc., Rockville, MD.
Very Low Frequency Transmission Loss in Shallow Water.
Final rept.,
Raymond H. Ferris. May 81, 55p Rept no. MAR-TR-263
Contract N00014-81-C-0164

In this study, acoustic transmission loss is calculated at frequencies below cut-off for a shallow water duct. A highly idealized model, based on realistic estimates of the gross acoustic properties of the sea-bed, is used to calculate the energy distribution in range, frequency, and depth as functions of the major environmental parameters. Results show that values of loss, at frequencies below cut-off, are similar to those at the frequency of minimum loss above cut-off. (Author)

AD-A100 702/0 PC **A02**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA. Valley Forge Research Center.
Factors Affecting Mean Power Response to Multipath Rays Arriving at Different Elevation Angles, and Multibeam Noise Correlation.
Quarterly progress rept. no. 32,
Fred Haber, and Paul Yeh. Feb 80, 11p
Contract N00014-77-C-0252

No abstract available.

AD-A100 715/2 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
The Deep Ocean Sound Channel in Areas Around Australia,
Daniel J. Whelan. Oct 80, 39p Rept no. MRL-R-788

The physicochemical data collected on MRL cruises OP7893 (Southern Indian Ocean), OP7704 (Coral Sea) and OP7505 (Around Tasmania) have been used to determine the acoustical properties predicted for the deep ocean sound channel (SOFAR axis) in these bodies of water. (Author)

AD-A100 791/3 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design and Development of a Graphics System for Display of Sound Spectrograms.
Master's thesis,
Paul A. Dundas. Dec 80, 164p Rept no. AFIT/GE/EE/80D-17

A graphics system for display of sound spectrograms was designed and implemented on a Data General NOVA computer which is interconnected with a S-100 bus system. The system allows the user to interactively select a section of the spectrogram for further analysis through the use of a set of cursors. The computer systems used in the development of this project are described. The theory involved in the generation of digital sound spectrograms is detailed along with the display methodology used. The user is provided the choice of four spectral windows and the relative merits of each window are described and compared. The six major classifications of spectrogram patterns -- called sound-pattern groups -- are described. Spectrograms that show the characteristic pattern for each sound-pattern group are presented along with spectrograms that show the differences between narrow and wide-band spectral analysis. The computer programs developed on both the NOVA and the S-100 system are described. (Author)

AD-A100 941/4 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA. Dept. of Ocean Engineering.
Multipath Variability Due to the Gulf Stream,
R. C. Spindel, and John L. Spiesberger. 9 Jun 80, 13p Rept nos. WHOI-81-56, WHOI-CONTRIB-4641
Contracts N00014-77-C-0196, N00014-79-C-0071
Prepared in cooperation with Scripps Institution of Oceanography, San Diego, La Jolla, CA. Pub. in Jnl. of the Acoustical Society of America, v69 n4 p982-988 Apr 81.

No abstract available.

AD-A101 100/6 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Experimental Study of Noise Produced by an Underwater Acoustic Bubble Screen.
Master's thesis,
Clark Thomas Kelly. Jun 81, 65p

Measurements in the Naval Postgraduate School's anechoic water tanks were conducted to determine the acoustic noise in the frequency range twenty hertz to ten kilohertz associated with injecting air into the tank through perforations in a two inch diameter PVC pipe. The effective source level for a pipe having several rows of smaller holes is ten to fifteen decibels smaller over most of the band than for pipe having a single row of holes which produces the same flow rate. The measurements also indicate that the dominant source of noise is that associated with bubble formation and that the second most important source is from ascending bubbles. The impetus for this work was to study various aspects of the problem of designing a sound insulating bubble screen for the Carr Inlet Range of the Puget Sound Naval Shipyard. (Author)

20B. Crystallography

AD-A100 634/5 PC **A02**/MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ. Electronics Technology and Devices Lab.
Growth and Characterization of Bulk, Semi-Insulating Gallium Arsenide.
Research and development technical rept.,
R. L. Ross, T. R. AuCoin, R. O. Savage, J. J. Winter, and R. O. malik. May 81, 23p Rept no. DELET-TR-81-12

The physical and electrical properties of GaAs show it to be an important semiconductor material for use in various electronic devices associated with advanced military systems. However, the realization of enhanced device performance has been delayed, partly due to the lack of consistent, high quality, semi-insulating GaAs substrate material. A modified liquid-encapsulated Czochralski technique employing pressure-assisted, in-situ compounding is described. This process, first demonstrated in the United States by the US Army Electronics Technology and Devices Laboratory, consistently yields high resistivity (to 10 to the 9th power ohm-cm) GaAs without the intentional addition of charge compensators. This approach is now becoming the basis for U.S. volume produc-

tion of large diameter, high quality, semi-insulating GaAs material. An automated system for the measurement of transport properties by use of the van der Pauw method is described. A mixed conduction analysis allows the direct determination of individual carrier concentrations and mobilities, intrinsic carrier concentration and Fermi level. Applied to ET&DL's non-Cr-doped GaAs, this analysis yields electron mobilities higher than Cr-doped material and Fermi levels which are nearly intrinsic. (Author)

AD-A100 641/0 PC **A08**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Chemistry.
Growth of Pure Single Crystals of Alkali Halides and Alkaline Earth Fluorides.
Final technical rept. 1 Mar 76-30 Sep 78,
W. J. Fredericks. May 81, 152p RADC-TR-80-413
Contract F19628-76-C-0156, ARPA Order-3096

The final report covers the design of ion selective filters and development of an ion exchange purification system for potassium bromide. The system consists of an ion selective filter for passage of potassium ions and a bromide anion exchange system for reduction of anionic impurities. Because of the high ionic strength of the solutions used and particularly their ability to hydrolyze amide and ester bonds, limitations are imposed on the materials that can be used for construction of those parts of the systems that contact these solutions. Certain addition polymers are more promising for construction of the components of such a system than others, these are discussed in the body of the report. A special group of components have been designed and assembled to provide the fittings, valves, electrode chambers, sampling valves, columns and filters necessary for a closed purification system. The preparation of the resins for use in such a system required that their conversion to the forms required for purification of KBr, require that the reactions for this conversion go almost to completion. The extent of conversion of the resins affect the operational characteristics of the system and are discussed in this report. The product of the initial purification is a strongly acid KBr solution and the techniques were developed to minimize external contamination during reduction of the purified salt solution to a solid. The final purification step made during the growth of the crystal is treatment with a reactive gas. A greaseless reactive gas manifold was constructed and several reactive gas treatments were used in an attempt to purify the KBr.

AD-A101 024/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Technique for Producing Epitaxial Films on Reuseable Substrates.
Journal article,
Robert W. McClelland, John C. C. Fan, and Carl O. Bozler. 21 Apr 80, 4p JA-5119, ESD-TR-81-35
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v37 n6 p560-562, 15 Sep 80.

No abstract available.

AD-A101 031/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Heteroepitaxy of Ge(1-x)Si(x) on Si by Transient Heating of Ge-Coated Si Substrates.
Journal article,
Frances M. Davis, John C. C. Fan, Ronald P. Gale, and George H. Foley. 31 Jul 80, 5p JA-5127, ESD-TR-81-68
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v37 n11 p1024-1027, 1 Dec 80.

No abstract available.

AD-A101 039/6 PC **A02**/MF **A01**
New Jersey Inst. of Tech., Newark.
Mercury Cadmium Telluride Sputtering Research.
Annual technical rept.,
Roy H. Cornely. 1 Jun 81, 19p AFOSR-TR-81-0531
Grant AFOSR-77-3249

A large number of 5-10 micron thick n and p-type films on Si and CdTe substrates were prepared by Hg vapor rf triode-sputtering using pressed-powder targets. The targets had different percentages of CdTe particles and thus films with the CdTe mole percent (x values) between 0.18 and 0.27 were obtained. It was demonstrated that the grain size and mobility of the sputtered polycrystalline films, with a high degree of (111) crystal orientation, could be greatly increased by annealing the films at 553-623 degrees Kelvin in a Hg atmosphere. For example, x = 0.27 films had as-sputtered electron mobilities less than 20 percent of ideal bulk-crystal material at 300 degree Kelvin and less than 4 percent at 85 degree Kelvin with free electron concentrations 20 times intrinsic material at 85 degrees. After annealing at 553 degrees in 74 mm pressure of Hg, the electron mobilities were 71.5 and 16.5 percent of ideal values at 300 and 85 degrees respectively with carrier concentrations in the 10 to the sixteenth per cubic cm range. Similar results were obtained using CdTe and Si substrates and for other compositions. For films with 0.18 CdTe mole percent, electron mobilities of 24,000 cm squared per volt second were measured at 85 degrees. Two step annealing processes, with separate temperatures for grain size enlargement and stoichiometry adjustment, and low temperature heat treatments for preventing peeling by grading the Si-(Hg,Cd)Te interface appear necessary for further optimization of the annealing effects. (Author)

AD-A101 049/5 PC **A02**/MF **A01**
State Univ. of New York at Albany. Dept. of Physics.
The Vacancy in Cubic Tetrahedrally Coordinated Materials,
Richard L. Kleinhenz, Satya N. Sahu, Vijay A. Singh, and James W. Corbett. 2 Mar 81, 4p
Contract N00014-75-C-0919
Pub. in Physics Letters, v83A n6 p291-293, 8 Jun 81.

No abstract available.

N81-26558/9 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Ebic and Hvtem Studies of Rtr Silicon Ribbon.
B. Cunningham, H. Strunk, and D. Ast. Apr 81, 17p NASA-CR-164526, JPL-9950-520
Contract JPL-954852

The defect structure of RTR ribbon 6-731, run 803 was studied. Prior to laser recrystallization the defect structure consists of closely spaced twin and grain boundaries. Precipitation of impurities occurs after laser recrystallization. The observation of electrically active defects in EBIC was correlated with HVTEM studies. Pairs of electrically active defects in twin boundaries are due to stacking faults connecting the twin boundaries.

N81-26969/8 PC **A08**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
On the Cooperative Jahn-Teller Effect in Ternary Chromium (2) and Copper (2) Halides.
W. J. Crama. 1980, 159p INIS-MF-5987

The hexagonal perovskite structure next to some cubic perovskite and related structures was examined. Structure determinations are performed on (BETA), (-)-CsCrCl3, (BETA), (ALPHA)-RbCrCl3, (BETA), (ALPHA)-RbCuCl3, (ALPHA), (-)-CsCuCl3 and Rb3Cu2Cl7.

UCRL-84146 PC **A02**/MF **A01**
California Univ., Davis. Dept. of Applied Science.
Plastic Dislocation Motion Via Nonequilibrium Molecular and Continuum Dynamics.
W. G. Hoover, A. J. C. Ladd, and N. E. Hoover. 29 Sep 80, 24p CONF-8010186-1
Contract W-7405-ENG-48
Symposium on interatomic potentials and computer simulation of defects in metals, Pittsburgh, PA, USA, 6 Oct 1980.

The classical two-dimensional close-packed triangular lattice, with nearest-neighbor spring forces, is a convenient standard material for the investigation of dislocation motion and plastic flow. Two kinds of calculations, based on this standard material, are described here: (1) Molecular Dynamics simulations, incorporating adiabatic strains described with the help of Doll's Tensor, and (2) Continuum Dynamics simulations, incorporating periodic boundaries and dislocation interaction through stress-field superposition. (ERA citation 06:024520)

20C. Electricity and Magnetism

PB81-204810
(Order as PB81-204802, PC **A05**/MF **A01**)
Nanjing Univ. (China). Inst. of Solid State Physics.
A Closed Form for the Series Formula of the Superconducting Critical Temperature,
Jianhua Cai. 28 Mar 80, 3p
Included in Kexue Tongbao, v25 n9 p725-727 Sep 80.

A closed form for the series formula of the superconducting critical temperature is derived and is used to discuss the asymptotic behavior of the first order variational derivative of (t sub c) with respect to ((alpha squared) F) at high and low frequencies.

UCID-19024 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Translation Operator for Finite Dmensional Electromagnetic Fields.
A. Q. Howard, Jr. Apr 81, 45p
Contract W-7405-ENG-48

Computation of electromagnetic fields in particular applications is usually accompanied by the adhoc assumption that the field contains a finite number of degrees of freedom. Herein, this assumption is made at the outset. It is shown that if an annular region between two closed surfaces contains no sources or sinks and is isotropic, lossless and homogeneous, a unique translation operator can be defined algebraically. Conservation of energy defines the translation operator T to within an arbitrary unitary transformation. The conditions of causality, unitarity and energy conservation are shown to uniquely determine T. Both scalar and vector fields are treated. In both of these cases, frequency and time domain transforms are computed. The transform T is compared with the analagous one as derived from the time domain Stratton-Chu Formulation. The application to a radiation condition boundary constraint on finite difference and finite element computations is discussed. (ERA citation 06:022866)

20D. Fluid Mechanics

AD-A100 597/4 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Three-Dimensional Subsonic Flows and Their Boundary Value Problems Extended to Higher Dimensions.
Technical summary rept.,
Guang-Chang Dong. Mar 81, 38p Rept no. MRC-TSR-2193
Contract DAAG29-80-C-0041

In this paper, the steady, irrotational, subsonic flow of a gas around a given profile is studied in the case of arbitrary space dimension greater than two. We prove that the solution of this problem exists, is unique, and depends continuously on the incoming flow. This extends the previous results of Bers and of Finn and Gilbarg. (Author)

AD-A100 598/2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
An Energy Method for the Equations of Motion of Compressible Viscous and Heat-Conductive Fluids.
Technical summary rept.,
Akitaka Matsumura. Mar 81, 20p Rept no. MRC-TSR-2194
Contract DAAG29-80-C-0041, Grant NSF-MCS79-27062

A priori estimates for solutions of the quasilinear hyperbolic-parabolic equations governing the initial value problem describing the motion of compressible, viscous and heat-conductive, Newtonian fluids are derived by means of a new energy method. This technique enables us to simplify and unify our previous results on the global existence in time and uniqueness of smooth solutions of these equations for sufficiently smooth and 'small' initial data and to obtain their rate of decay. (Author)

AD-A100 599/0 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Trapping of Water Waves Above a Round Sill.
Technical summary rept.,
Yuriko Yamamuro. Mar 81, 35p Rept no. MRC-TSR-2195
Contract DAAG29-80-C-0041, Grant NSF-MCS79-27062

The three-dimensional problem of wave-trapping above a submerged round sill was first analyzed by Longuet-Higgins (1967) on the basis of a linear shallow-water theory. The large responses predicted by the theory were, however, not well borne out by the experiments of Barnard, Pritchard and Provis (1981) and this has motivated a more detailed study of the problem. A full, linear theory for both inviscid and weakly viscous fluid, without any shallow-water assumptions, is presented here. It reveals important limitations on the use of shallow-water theory and the reasons for them. In particular, while the qualitative features of wave-trapping are similar to those of shallow-water theory, the nearly-resonant frequencies differ significantly, and since the resonances are narrow, the observed amplitudes at a given frequency differ greatly. The geometry is strongly indicative of long waves and the dispersion relation appears quite consistent with that, but the part of the motion at wave numbers that are not small has, despite the small amplitude, a substantial effect on the response to excitation. (Author)

AD-A100 632/9 PC **A24**/MF **A01**
Purdue Research Foundation, Lafayette, IN.
Workshop on Coherent Structure of Turbulent Boundary Layers.
Final rept. 1 Jun-30 Sep 78,
D. E. Abbott, and C. R. Smith. Nov 78, 552p
AFOSR-TR-78-1533
Grant AFOSR-76-3015
Prepared in cooperation with Lehigh Uviv., Bethlehem, PA. Dept. of Mechanical Engineering and Mechanics.

A discussion of the role of visual and probe measurements in turbulent structure research is given, stressing the constraining limitations of each and the interrelationships of the two methods. A selective history of the use of visual results is discussed in terms of the constraining limitations of the visual methods. Retrospective remarks are presented concerning the Stanford visual data on the inner portions of turbulent boundary layer structure. The final section discusses some general features of what is currently known about the structure of turbulent boundary layers, draws conclusions from this general knowledge, and poses questions that seem currently important in gaining further understanding. The paper stresses overall aspects of the structure problem at the expense of details in an attempt to gain perspective. (Author)

AD-A100 817/6 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Navier-Stokes Solutions for a Supersonic Coflowing Axisymetric Nozzle with a Thick Base Annulus.
Doctoral thesis,
Gerald Alan Hasen. Apr 81, 161p Rept no. AFIT/DS/AA/81-2

Numerical solutions of the Navier-Stokes equations are obtained for a supersonic coflowing axisymmetric nozzle (Infinity) = 2,200,000. Five jet pressure ratio conditions ranging from a highly overexpanded case which exhibits a Mach disc shock formation to a slightly underexpanded case are examined and solved numerically. MacCormack's explicit method is applied as the numerical algorithm. An adaptive grid is utilized in the nozzle wake to allow the fine mesh region of the computational grid to remain in areas containing relatively high flow gradients. Locally dependent eddy viscosity modelling is applied in the form of a Cebeci-Smith two layer model in the boundary layer region on the nozzle walls, and a form of the Prandtl mixing length model in the nozzle wake. A two-dimensional wedge-flat plate validation case was computed using these models with good results. The computational results for the coflowing nozzle accurately reproduced the experimentally observed viscous effects on the nozzle base pressure and shock locations that are caused by the thick nozzle base annulus. Correct transition was achieved numerically from regularly reflected shock waves at the line of symmetry in the jet core to the Mach disc reflection at the appropriate nozzle pressure ratio. (Author)

AD-A100 877/0 Not available NTIS
New Jersey Inst. of Tech., Newark.
Deposition of Suspensions in the Entrance of a Parallel-Plate Channel with Gravity Effect.
T. A. Korjack, and R. Y. Chen. 16 May 79, 8p
ARO-13614.1-E
Contract DAAG29-80-C-0090
Availability: Pub. in Computers and Fluids, v8 p305-311 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A101 052/9 Not available NTIS
TRW Defense and Space Systems Group, Redondo Beach, CA.
Three-Dimensional Instability of Finite-Amplitude Water Waves.
J. W. McLean, Y. C. Ma, D. U. Martin, P. G. Saffman, and H. C. Yuen. 26 Sep 80, 4p
Availability: Pub. in Physical Review Letters, v46 n13 p817-820, 30 Mar 81 (No copies furnished by DTIC/NTIS).

No abstract available.

N81-26077/0 PC **A08**/MF **A01**
Nielsen Engineering and Research, Inc., Mountain View, CA.
Calculation of Two-Dimensional Inlet Flow Fields by an Implicit Method Including Viscous Effects: Program Documentation and Test Case.
Final Report, 12 Sep. 1979 - 30 Nov. 1980.
S. Biringen, and O. J. Mcmillan. Jun 81, 170p
NASA-CR-3414, NEAR-TR-233
Contract NAS1-15951

The source listing of a computer code for calculating the flow fields in a supersonic free stream is given. The application of this code to an inlet on an airbreathing missile is also presented.

N81-26417/8 PC **A02**/MF **A01**
Stanford Univ., CA. Joint Inst. of Aeronautics and Acoustics.
Some Observations of Flow Structure in Multiple Jet Mixing.
A. Krothapalli, D. Baganoff, and K. Karamcheti.
Mar 79, 10p NASA-CR-166179, SU-JIAA-TR-19
Contract NASW-2233
Presented at the 2ND Symp. On Turbulent Shear Flows, London, 2-4 Jul. 1979.

Results of hot wire measurements in an incompressible jet issuing from an array of rectangular lobes, equally spaced with their small dimensions in a line, both as a free jet, and as a confined jet, are presented. In the case of a multiple free jet, the flow field for downstream distance x greater than 60D (D = width of a lobe) resembles that of a jet exiting from a two-dimensional nozzle with its short dimension being the long dimension of the lobe. The field of turbulence is found to be nearly isotropic in the plane containing the small dimension of the lobes for x greater than 60D. In the case of a confined multiple jet, the flow field is observed to be nearly homogeneous and isotropic for x greater than 60D.

PB81-220337 Not available NTIS
National Bureau of Standards, Washington, DC.
Molecular Diffusion in Oscillating Laminar Flow in a Pipe.
Final rept.,
L. P. Purtell. May 81, 5p
Pub. in Phys. Fluids 24, n5 p789-793 May 81.

The effect of flow oscillations on the axial diffusion of a solute in a pipe is analyzed theoretically by a perturbation method for small oscillation Reynolds numbers. The specific case of an initial step distribution in concentration is solved to second order. Numerical results of diffusion enhancement are given for several values of the parameters involved and are found to be conveniently summarized in terms of an equivalent diffusion parameter.

PB81-220352 Not available NTIS.
National Bureau of Standards, Washington, DC.
Turbulent Boundary Layer at Low Reynolds Number.
Final rept.,
L. P. Purtell, P. S. Klebanoff, and F. T. Buckley.
May 81, 10p
Pub. in Phys. Fluids 24, n5 p802-811 May 81.

The results of an experimental investigation of a turbulent boundary layer with zero-pressure gradient directed toward extending the data base at low Reynolds numbers are presented. The data obtained are concerned primarily with mean-velocity distributions, skin-friction coefficients, and distributions of intensity of the longitudinal-component of the turbulent-velocity fluctuations for Reynolds numbers based on momentum thickness as low as 465. The validity, at low Reynolds numbers, of the semiempirical laws characterizing the inner and outer regions of the boundary layer is examined.

UCRL-84691 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Simulating Interactions Between Turbulence and Particles in Erosive Flow and Transport.
A. C. Buckingham, and W. J. Siekhaus. 1981, 13p CONF-810702-2
Contract W-7405-ENG-48
International conference on numerical methods for laminar and turbulent flow, Venice, Italy, 13 Jul 1981.

A numerical procedure is described for simulating fluctuating gas motions and resulting forces on gas-borne particulates. Included are some of the particle influences which significantly alter the driving turbulent field. The coupling apparent between dispersed phase particles and continuous phase turbulent flow is introduced with the help of observations from complementary two-phase combustion wind tunnel experiments. In the simulations, particle-to-gas relative velocities and resulting forces on the particles are obtained at incremental time steps for statistically representative particle groups using a random selection method. The fluctuating velocity components are constrained so that their ensemble averages correspond to the pre-determined local mean turbulent energy. The influence of gas-borne particles on turbulent transport, combustion kinetics and subsequent wall surface erosion/corrosion is the central issue of this research. (ERA citation 06:022443)

UCRL-85337 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Solution of the Time-Dependent, Three-Dimensional Incompressible Navier-Stokes Equations Via FEM.
P. M. Gresho, S. T. K. Chan, R. L. Lee, and C. D. Upson. Jan 81, 14p CONF-810702-3
Contract W-7405-ENG-48
International conference on numerical methods for laminar and turbulent flow, Venice, Italy, 13 Jul 1981.

Simple techniques for solving the time-dependent, three-dimensional incompressible Navier-Stokes equations via the finite element method are described and involve (1) utilizing the trilinear 8-node isoparametric brick element for the velocity approximation (also for temperature and concentration where relevant) with piecewise-constant approximation of the pressure and (2) the time-integration technique which is basically the explicit forward Euler method, with the pressure obtained by solving the consistently derived Poisson equation. The advantages (speed and simplicity) and the disadvantages (stability limits on time-step size and the need to invoke mass lumping) of this technique

are discussed and numerical examples presented. (ERA citation 06:022444)

UCRL-85354 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Chemical Engineering.
Solution of the Time-Dependent Incompressible Navier-Stokes Equations Via a Penalty Galerkin Finite Element Method.
R. L. Sani, B. E. Eaton, P. M. Gresho, R. L. Lee, and S. T. Chan. Jan 81, 12p CONF-810702-1
Contract W-7405-ENG-48
International conference on numerical methods for laminar and turbulent flow, Venice, Italy, 13 Jul 1981.

The existence of an initial non-physical transient when using the penalty method in modeling the time-dependence incompressible Navier-Stokes equations is investigated theoretically and demonstrated numerically using the Galerkin finite element technique. A stable, variable step time integration scheme which can overlook the initial non-physical transient while using reasonable-sized time steps is described. Numerical examples illustrating the time integration scheme and concomitantly the difference in transient response of an incompressible fluid and its slightly compressible (penalty) analog are presented. (ERA citation 06:022445)

20E. Masers and Lasers

AD-A100 592/5 PC **A02**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Thallium Mercury Laser Development.
Final rept. 1 Feb 80-31 Jan 81 on Phase 3,
C. S. Liu, and D. W. Feldman. 1981, 15p
Contract N00014-78-C-0131
See also report dated 17 Apr 80, AD-A090 840.

A short resonator (30 cm) CuBr laser was built and its performance measured as a function of various operating conditions. Aside from packaging and prime power considerations which were not addressed in this study, the CuBr laser has exceeded all minimum specifications for the Navy bathymetry application. One set of simultaneously obtained operating conditions are as follows: 140 micro-Joules per pulse, 4.5 ns laser pulse width, 16 kHz repetition rate, 0.15% efficiency, 525 C operating temperature. Our analysis indicates that in order to develop a Cu vapor laser for bathymetry application having an ultra-short laser pulse width (<5 nsec) the laser cavity has to be made shorter than or equal to 30 cm and the excitation rate has to be very high. Further issues relating to other bathymetry laser requirements such as energy per pulse, efficiency, repetition rate, lifetime, compactness, ruggedness and portability have been easily achieved by our existing laser tube.

AD-A100 594/1 PC **A02**/MF **A01**
McDonnell Douglas Astronautics Co.-East, St. Louis, MO.
Improved Injection Laser Waveguide Coupler.
Final rept.,
Philip Bear. May 81, 23p
Contract N00173-79-C-0470

The present program goal was to enhance the waveguide coupler design to provide a device which can be aligned with a standard micromanipulator and achieve 50% or better coupling efficiency. The design approach was to develop static mechanical spacers for the waveguide coupler which furnish easy and precise transverse and longitudinal positioning of a LiNbO3 waveguide with respect to an injection laser diode. The program was to include the following tasks: (1) modify the waveguide coupler design and assembly procedures to provide a device that can be readily assembled and will achieve near theoretical coupling efficiency; (2) fabricate these optimized couplers using Hitachi laser diodes and evaluate these devices; (3) deliver two couplers without Ti:LiNbO3 waveguides attached; and (4) provide a cost estimate for the fabrication of ten such units. The variation in tolerances of the components and the capability of present state-of-the-art micropositioning devices to obtain and hold mechanical position accuracies required for the laser diode to waveguide coupler are not adequate to obtain reliable devices that meet the program goal of 50% coupling efficiency. The positional stability of bonding materials for the laser diode and waveguide were also determined to be inadequate to maintain the precise tolerance required. It is recommended that consideration be given to an R and D program to investigate the viability of a monolithic integrated optic approach for the laser diode to waveguide coupler using a common substrate.

AD-A100 630/3 PC **A05**/MF **A01**
RPC Industries, Hayward, CA.
Phase Transition Cooled Window Studies for High Average Power Electron Guns.
Final rept.,
G. Loda, and D. Forcier. Dec 80, 88p Rept no. RPC-80-11403-80-FR
Contract DAAK40-79-C-0258, ARPA Order-3498

The window used to transmit electron beams for use in high average power UV/visible lasers has been a critical technology issue. The window structure must satisfy a number of conflicting requirements including: vacuum integrity, strength to overcome both the static and dynamic pressure loads of the laser gas and a low mass density to minimize energy loss by the electron beam. In addition, it must not perturb the laser gas flow and must be able to dissipate the power deposited by the electron beam. Two experiments were undertaken to demonstrate the applicability of phase transition cooling for high power laser systems. In the first of these a full width 50 cm module was tested with a constant input heat source. The second experiment used a pulsed e-beam source to demonstrate cooling for a low duty cycle high peak power pulsed system. The applicability of phase transition cooling for a dual foil geometry was clearly demonstrated. Cooling rates in excess of 100 W/(sq cm)/foil surface with mass flow rates consistent with low areal mass density were achieved. This represents a factor of ten improvement over prexisting state of the art. (Author)

AD-A100 677/4 PC **A02**/MF **A01**
Northrop Research and Technology Center, Palos Verdes Peninsula, CA.
Scaling Studies of Efficient Raman Converters.
Technical rept. 22 Jul-21 Nov 80,
H. Komine, and J. B. West. Dec 80, 14p Rept no. NRTC-80-34R
Contract N00014-80-C-0442, DARPA Order-3125

The objective of this program is to demonstrate the scaling potential of efficient Raman frequency conversion techniques for ultraviolet lasers. Molecular hydrogen is used as the Raman medium and an oscillator-amplifier configuration is employed to maximize conversion efficiency and beam quality. At the present time, major program milestones have been successfully met. Injection locking has been demonstrated to be an efficient technique for laser bandwidth control. Good optical beam quality has been achieved on the XeF laser through the use of unstable resonator optics. Conversion of XeF laser radiation to blue-green wavelengths has been demonstrated in the Raman oscillator. Work is now in progress on assembly of the Raman oscillator-amplifier system to complete the final phase of the program. It is expected that 50% energy efficiency will be demonstrated for the shift of 353 nm XeF radiation to 498 nm. (Author)

AD-A100 719/4 MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Laser Journal (Selected Articles).
Ji Zhong, Qun Li, and Chang Zunkui. 3 Jun 81, 43p Rept no. FTD-ID(RS)T-2101-80
Edited trans. of Laser Journal (China) v7 n1 p1-12, 49-51 1980.
Availability: Microfiche copies only.

No abstract available.

AD-A100 840/8 Not available NTIS
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
A Microwave-Pumped XeCl Laser,
A. J. Mendelsohn, R. Normandin, S. E. Harris, and J. F. Young. 9 Jan 81, 4p ARO-16996.3-P
Contract ARO-20-81
Availability: Pub. in Applied Physics Letters, v38 n8 p603-605, 15 Apr 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 864/8 PC **A04**/MF **A01**
JAYCOR, Alexandria, VA.
Studies of Gyrotron Efficiency Enhancement and Cherenkov Broadband Amplification.
Final rept. 1 Aug 78-31 Jan 80,
Robert A. Smith, Alan Dudas, and John L. Vomvoridis. 5 Aug 80, 62p Rept no. JAYCOR-PSD-200-80-003-FR
Contract N00014-78-C-0613
Includes Rept. no. NRL-MR-3983 dated 18 Apr 79, AD-A069 461.

The non-linear theory was developed for the efficiency enhancement of the electron cyclotron maser, by tapering the external magnetic field. The experimental design aspects have been considered for the effects of tapered magnetic fields on the gyrotron efficiency. An alternate configuration has been theoretically investigated, for the utilization of a cherenkov-type interaction for the generation of radiation by an electron beam in a dielectrically loaded waveguide.

AD-A100 905/9 PC **A09**/MF **A01**
Avco-Everett Research Lab., Inc., Everett, MA.
Mode Medium Interaction. A Theoretical Study.
Final technical rept. 1 Jul 79-30 Jun 80,
A. Ballantyne, and C. Duzy. Sep 80, 176p
AFOSR-TR-81-0519
Contract F49620-79-C-0195

An instability in the output of a high-power unstable-resonator cw CO2 laser is analyzed in terms of the perturbative effect of an acoustic wave which is induced by laser heating. The alignment sensitivity of such a laser is also explained in terms of a temperature gradient along the gas-flow direction, which is transverse to the laser axis. We extend our instability analysis to a simple one-dimensional model of a supersonic laser, which we determine to be stable. Finally, we present a new computational technique to determine the intensity distribution and output coupling of the modes of an unstable resonator whose gain is saturated by a variable amount by the flux of the lowest-loss mode. The intensity distribution of this lowest-loss mode is determined self consistently. (Author)

AD-A100 906/7 PC **A06**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Metal Vapor Laser Contaminant Study.
Final rept.,
T. W. Karras, and B. G. Bricks. May 80, 103p
AFOSR-TR-81-0520
Contract F49620-79-C-0177

Contaminants evolved during lead and copper vapor laser operation are identified. The principal long term source is the hot high density alumina discharge tube. Procedures for decontamination down to 10 to the -6 mm partial pressure are described. Such decontamination is shown to be necessary for proper wick function and sealed-off operation. In conjunction with this work, a model has been demonstrated that relates metal vapor containment time to wick dimensions and a new sealed-off laser design has been successfully tested. (Author)

AD-A101 037/0 PC **A15**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Directed Energy Directorate.
Compilation of Atomic and Molecular Data Revelant to Gas Lasers. Volume VIII.
Technical rept.,
E. W. McDaniel, M. R. Flannery, E. W. Thomas, S. T. Manson, and J. W. Gallagher. Dec 80, 329p Rept no. DRSMI-RH-81-4-VOL-8
See also Rept. Nos. RH-77-1, AD-A037 680 and DRSMI-H-78-1-VOL-6, AD-A082 665.

The present volume serves to update most of the areas covered in the previous documents. Such areas include all nuclear processes, and atomic collisions occurring at high energies, i.e., above about 100 eV impact energy. However, even in those areas where new data are not presented

here, references are given to past volumes in order to facilitate access to the previous data. Another function of the present volume is to expand somewhat the scope of our data coverage, both with respect to atomic nd molecular structural properties and with respect to atomic collisions (by the latter term, we mean two- and three- body collisions between electrons, ions, atoms, molecules, and photons at impact energies sufficiently low that nuclear forces are unimportant). New species and sets of collision partners that have recently assumed importance are treated here, and other systems that may become important in the gas laser context are given attention. A significant amount of new material is also added to the chapter on surface impact phenomena, partly because of current interest in hollow-cathode lasers.

AD-A101 065/1 PC **A04**/MF **A01**
Litton Systems, Inc., Morris Plains, NJ. Airtron Div.
Manufacturing Methods and Technology Engineering for Batch Processing Neodymium Doped YAG Laser Rods.
Final rept. Feb 77-Oct 79,
David J. Dentz. Nov 80, 72p
Contract DAAB07-77-C-0375

The development of the fixturing and process for the batch fabrication of Nd:YAG laser rods is reported. The fixturing was designed to hold 16 (4.27 mm x 43 mm) laser rods during the grinding and polishing of both ends. The program goal of a fabrication rate of 12 rods per 8 man hours was achieved with the process developed. (Author)

AD-A101 068/5 PC **A04**/MF **A01**
Laser Diode Labs., Inc., Metuchan, NJ.
Development of Long Wavelength Single Longitudinal (SLM) Injection Laser Diodes.
Final technical rept. Nov 79-Dec 80,
Frank D. Speer, and Thomas E. Stockton. 30 Dec 80, 65p DELNV-79-C-0239
Contract DAAK70-79-C-0239

Development of Long Wavelength Single Longitudinal (SLM) Injection Laser Diodes emitting in the 1.3 micron region, utilizing a buried heterojunction BH structure. This final report describes efforts directed toward the development and optimization of these type devices and, in particular, concentrates on the following points: (1) Optimization of the double heterojunction DH structure; (2) Process development connected with the fabrication of buried heterojunction BH laser structures; (3) Modification BH laser structure and fabrication technique to optimize severe melt back; (4) Modification of the regrowth LPE technique to resolve melt back and the optimization of the N-P reverse bias junctions; and (5) Device performance. (Author)

DE81024059 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Vacuum Ultraviolet Light Production by Nuclear Irradiation of Liquid and Gaseous Xenon.
G. C. Baldwin. May 81, 12p LA-8786
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

Recent Los Alamos investigations suggest that a liquefied noble element may be the long-sought medium for a nuclear-excited laser or flashlamp. This report suggests research needed to confirm this finding and to provide a basis for design and application studies. Quantitative and qualitative information are needed on the nature and behavior of the excited species, the effects of impurities and additives in the liquid phase under nuclear excitation, and the existence and magnitudes of nonlinear effects. Questions that need to be addressed and the most appropriate types of facilities for this task are identified. (ERA citation 06:024015)

LA-UR-81-1439 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Out-of-Focus Intensity Distribution: Effects of Focal Number and Aberration.
G. A. Kyrala. 1981, 7p CONF-810429-25
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

Shock wave experiments contemplated on powerful CO sub 2 lasers require uniform planar illuminations over spot sizes much larger than the diffraction limit focal spot size of the focusing optics. Cost as well as space considerations limit one's choice of optics to parabolic mirrors with focal lengths between 78 and 150 cm, and apertures to 35 cm. Within these constraints one either modifies the incident laser energy distribution to modify the focal spot shape, or works out of the focal plane. The latter option is analyzed using a fast Fourier method to calculate the intensity distributions for two focal lengths (78 and 132 cm) and various measured optical distortions (Phase only) for the focusing optics. I found that a 78 cm element produced more uniform spots of diameter 500 mu m. The 132 cm element was less sensitive to focusing/positioning error than the 78 cm element. (ERA citation 06:024016)

LA-UR-81-1567 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Laser Damage Testing of Coated Reflectors at Excimer Laser Wavelengths.
S. R. Foltyn, and B. E. Newnam. 1981, 11p CONF-810429-33
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

An important parameter in the design of large-scale ultraviolet lasers (such as those envisioned for Inertial Confinement Fusion and Molecular Laser Isotope Separation) is the resistance to optical damage of windows, AR-coatings, and coated reflectors. In addressing the problem of evaluating and optimizing highly reflective dielectric stacks, we have measured the damage thresholds of a variety of 248-nm, 308-nm, and 351-nm reflectors. The coatings were composed of quarterwave stacks of oxide and/or fluoride films deposited on Suprasil 2 substrates. Testing was accomplished at 35 Hz with nominal 10-ns pulses focused to a mean 1/e exp 2 diameter of 0.5 to 0.6 mm. Damage threshold (defined as the highest fluence at which 10/10 sites survived 1000 shots) ranged from 1 to 5 J/cm exp 2 , with a strong dependence upon laser wavelength and reflector coating materials. (ERA citation 06:022436)

N81-26157/0 PC **A04**/MF **A01**
Boeing Co., Seattle, WA.
Laser Angle Sensor Development.
Final Report, 1979 - 1980.
C. R. Pond, and P. D. Texeira. Oct 80, 73p
NASA-CR-159385, NASA-159306
Contract NAS1-15987

Electrical and optical parameters were developed for a two-axis (pitch/roll) laser angle sensor. The laser angle sensor was a fringe counting interferometer, where interference fringes were generated by a small passive reflecting element on the model. The laser source and detector were mounted in the plenum above the model. Two axis optical distortion measurements of flow characteristics in 0.3 miransonic cryogenic tunnel were made with a shearing interferometer. The measurement results provided basis for estimating the optical parameters of the laser angle sensor. Experimental and analytical information was generated on model windows to cover the reflector. A two-axis breadboard was assembled to evaluate different measurement concepts. The measurement results were used to develop a preliminary design of a laser angle sensor.

PATENT-4 230 994
Not available NTIS
Department of Energy, Washington, DC.
Pulse Circuit Apparatus for Gas Discharge Laser.
Patent,
L. P. Bradley. Filed 31 May 78, patented 28 Oct 80, 9p PAT-APPL-911 248
Supersedes PAT-APPL-911 248-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus and method using a unique pulse circuit for a known gas discharge laser apparatus are described to provide an electric field for preconditioning the gas below gas breakdown and thereafter to place a maximum voltage across the gas which maximum voltage is higher than that previously available before the breakdown voltage of that gas laser medium thereby providing greatly increased pumping of the laser. (ERA citation 06:024030)

PATENT-4 233 570
Not available NTIS
Department of Energy, Washington, DC.
Tunable, Rare Earth-Doped Solid State Lasers.
Patent,
J. L. Emmett, R. R. Jacobs, W. F. Krupke, and M. J. Weber. Filed 11 Jan 78, patented 11 Nov 80, 7p PAT-APPL-868 633
Supersedes PAT-APPL-868 633-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Laser apparatus is described comprising combinations of an excimer pump laser and a rare earth-doped solid matrix, utilizing the 5d-4f radiative transition in a rare earth ion to produce visible and ultra-violet laser radiation with high overall efficiency in selected cases and relatively long radiative lifetimes. (ERA citation 06:024022)

PB81-221699 Not available NTIS
National Bureau of Standards, Washington, DC.
National Physical Laboratory-National Bureau of Standards Iodine-Stabilized Helium-Neon Laser Intercomparison.
Final rept.,
H. P. Layer, W. R. C. Rowley, and B. R. Marx. Apr 81, 3p
Pub. in Optical Letters 6, n4 p188-190 Apr 81.

The frequencies of two helium-neon lasers stabilized by intracavity saturated absorption of iodine (127I2) built at the National Bureau of Standards (NBS) and the National Physical Laboratory have been compared by beat-frequency measurement. The NBS laser exhibited a power-dependent frequency shift that was reproducible and significant in size (2x10 to the -10th power) over the working range of the power output. The orgin of the power shift has not been established, but several possible sources of the shift have been eliminated by our investigations. Specifically, the effect is not electronic in origin. No similar shift was observed in two lasers built at the National Physical Laboratory.

20F. Optics

AD-A100 700/4 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Determination of Integrated Optical Thickness of Clouds from Lunar Irradiance Measurements.
Final rept. 15 Jun-15 Oct 79,
M. G. Ceruti. 15 Oct 79, 45p Rept no. NOSC/TR-470
See also AD-771 827.

A procedure is suggested to obtain the effective optical thickness, tau of clouds by measuring the atmospheric transmission of moonlight both with and without cloud cover. The optical thickness is calculated from the transmission using a theory of R E Danielson, D R Moore and H C van de Hulst (The Transfer of Visible Radiation Through Clouds, J. Atmosph. Sci., 26, 1078 (1969)), later modified by E A Bucher, (Computer Simulation of Light Pulse Propagation for Communications Through Thick Clouds, Applied Optics, 12, No. 10, p 2391-2400 (1973)). By using a wide field of view receiver to measure the irradiance, one obtains a spatial averaged value of tau, rather than a point measurement. Therefore, this method of cloud optical thickness determination may be more reliable than some previously used methods. (Author)

AD-A100 732/7 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
A High Performance Fiber Optic Pressure Penetrator for Use in the Deep Ocean.
Progress rept. Jan 80-Jan 81,
S. J. Cowen. 26 Feb 81, 35p Rept no. NOSC/TR-644

This report describes results obtained in an FY 80 developmental program carried out at the Naval Ocean System Center, San Diego, under Independent Exploratory Development funding. The objective was to develop a robust, fully-demountable, high pressure penetrator design suitable for coupling light signals transmitted by optical fiber elements in an undersea cable operated at high ambient hydrostatic pressure into an electronics package or manned space. The feasibility of constructing such penetrators utilizing Graded Refractive Index (GRIN) rod lenses as combination pressure barriers and imaging devices has been demonstrated. Prototype realizations have exhibited excellent optical throughput performance and readily survive in excess of 10 000 psi pressure differential as well as tolerating a wide temperature range. The design lends itself to hermetic construction for applications requiring no vapor diffusion over long mission durations. Such devices exhibit excellent potential for satisfying SUBSAFE requirements for manned submarine applications. (Author)

AD-A100 747/5 PC **A04**/MF **A01**
Ampek Corp., Redwood City, CA. Data Systems Div.
Optical Joint Transform Correlator.
Final technical rept. 24 Jul 79-18 Jul 80,
Hugh B. Brown. 26 Jan 81, 61p DRSMI/RR-81-02
Contract DAAK40-79-C-0204

The Joint Transform Correlator was built using a combination of optical components, analog electronics, and digital electronics. The optical system breadboard can be used to evaluate the correlation process and determine tolerance limits of the optical process. Correlation is achieved using a reference matched filter adjacent to the input image. (Author)

AD-A100 800/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Phase Estimation Techniques for Active Optics Systems Used in Real-Time Wavefront Reconstruction.
Master's thesis,
Fernando Pinzon Rojas. Dec 80, 140p Rept no. AFIT/GEO/EE/80D-4

Two analyses ae presented, which involve estimation of constant phase from single detector and detector array measurements. The single detector analysis is carried out in a discrete mode to obtain algorithms based on photon counting. The method used follows the Maximum A Posteriori and Maximum Likelihood estimation theories. Both white Gaussian noise and Poisson Shot noise limited conditions are considered. Simulation results show that signal-to-noise ratios of 17 dB or better are needed to produce adequate estimates. Estimate improvement is obtained as more photon counts are performed. In this sense, photon counting seems to be inferior to current measuring, but the error variance is only 1.65 dB larger in the worst case, where three photon counts are performed. An extension of the single detector analysis is made, using only the Gaussian noise assumption, to derive an algorithm that jointly estimates the phase distribution over an optical wavefront. The procedure is based on a parametric dependence between the measurements performed by adjacent detectors, and on the a priori knowledge available through a covariance matrix. An algorithm for processing continuous waveform measurements is developed, but no computer simulation is included due to difficulties encountered in solving the feedback system equations.

AD-A100 979/4 PC **A07**/MF **A01**
California Univ., Los Angeles. Dept. of Physics.
Characterization of Infrared Optical Properties of Transparent Materials.
Interim technical rept. 1 Jan 80-31 Mar 81,
Rubin Braunstein. 15 May 81, 139p AFOSR-TR-81-0545
Grant AFOSR-78-3665

The spectral, distribution of the absorption in the spectral region from 2.5-12 micrometer was measured by infrared wavelength modulation technique on: CaF2; LiF; NaCl; NaF; LaF3; BaF2; MgF2, SrF2; MgO. Both surface and volume contaminants were identified. Rayleigh-Brillouin scattering was measured on single and polycrystalline KCl. In addition, Rayleigh-Brillouin and Raman measurements were performed on fluoride glasses. Infrared optical derivative spectroscopy was employed to determine: Stress in Si on sapphire, strain in ion implanted GaAs, free carrier screening of hyperbolic excitons in GaAs, deep levels in Si and GaAs and vibrational modes in oxides of Si, GaAs and HgCdTe. (Author)

AD-A101 036/2 PC **A06**/MF **A01**
Aerodyne Research, Inc., Bedford, MA.
MM&T: Testing of Electro-Optic Components.
Final rept. 28 Sep 79-28 Jun 80,
H. J. Caulfield. Feb 81, 110p ARI-RR-215, DRSMI/RH-CR-81-8, AD-E950 142
Contract DAAK40-79-C-0275

The contractor has studied the testing of electro-optic components with special emphasis on diamond-turned optics. The primary purpose of that study was to determine where new government initiatives could be most effective in moving this area forward. Besides an ordered list of recommended government actions, this study has resulted in+ an extensive survey of experts (the most extensive yet made), the largest annotated bibliography in the field, an improved form of Ronchi testing giving quantitative results, a general approach to nonconjugate interferometry, a high accuracy form of multiple-wavelength absolute distance interferometry, and a totally new approach to the generation of test holograms by computer. (Author)

AD-A101 044/6 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Single Holographic Element Wavelength Demultiplexer,
Joseph L. Horner, and Jacques E. Ludman. 25 Sep 80, 4p Rept no. RADC/ETR-81-0012
Pub. in Applied Optics, v20 p1845-1847, 15 May 81.

No abstract available.

AD-A101 056/0 PC **A03**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Turbulence Effects on Open Air Multipaths.
Final rept.,
Wendell R. Watkins, Kenneth O. White, and Laura J. Crow. May 81, 34p Rept no. ERADCOM/ASL-TR-0086

The possible effects of turbulence on the maximum usable pathlength of an open air multipath were investigated. Open air multipahts can be used in conjunction with scanning optical sources to measure trace gases along open air optical paths for field testing of military electro-optical systems including high energy lasers. Turbulence was found to be the major source of system degradation for an open air optical multipath. The effects of turbulence on beam spreading as a function of position along the multipath were measured. Multipath optics image and diffuse the input beam in a beam conserving fashion in producing the multipath. Turbulence has its strongest degrading effects on the diffused beams in the multipaths, thus open air multipaths would require turbulence shielding of this portion of the optical path to be effectively used, especially during high daytime turbulence levels. Such systems can, however, be easily used in enclosed building environments without any path shielding.

AD-A101 116/2 PC **A02**/MF **A01**
Texas Univ. at Austin.
Active Guided-Wave Devices.
Final rept.,
A. B. Buckman. 1979, 6p
Contract N00014-75-C-0753

The overall purpose of this contract was the theoretical and experimental study of multilayer guided-wave optical structures, and the search for novel effects introduced by the stratification which might be exploited to create active guided-wave devices with performance characteristics superior to their one-layer counterparts. This final report summarizes the principal research accomplishments under the contract, and concludes with some recommendations concerning future directions of research on multilayer guided-wave optics. (Author)

AD-A101 170/9 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Inst. for Pure and Applied Physical Sciences.
Long Pulse XeCl Laser Frequency Down Conversion and Low Voltage, Low Energy X-Ray Preionization Source.
Final rept. Oct 79-Mar 81,
J. I. Levatter, and S. C. Lin. May 81, 26p
Contract N00014-79-C-0955

The first program, Long Pulse XeCl Laser Frequency Down Conversion, was initiated following the encouraging Raman shifting results. The second program, Low Voltage, Low Energy X-Ray Preionization Source was undertaken after it was realized that the energy and power scaling of certain avalanche discharge excited lasers required a reliable, non-contaminating volumetric source of electron preionization as could be provided by moderate energy x-rays. In this initial experiment, the 308 nm UV output from the UCSD Xe Cl laser was focused into a lead vapor (Pb) heat pipe and the stimulated Raman emission in the blue-green was monitored. Research involved the refinement of the Raman down conversion experiment which consisted primarily of the improvement of the XeCl laser mode quality. This work and the results thereof are discussed in Section II. SEction III describes the results of an engineering program to build a reliable low energy X-ray source suitable for the preionization of rare-gas/halide and mercury-halide discharge excited lasers.

AD-A101 182/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Laser Sources and Detectors for Guided Wave Optical Signal Processing.
Journal article,
Ivars Melngailis. 11 Mar 80, 5p JA-5084, ESD-TR-81-28
Contract F19628-80-C-0002
Pub. in Optical Engineering, v19 n6 p941-944 Nov/Dec 80.

No abstract available.

LA-UR-81-1038 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Signal Enhancement by Spectral Equalization of High-Frequency Broadband Signals Transmitted Through Optical Fibers.
J. W. Ogle, P. B. Lyons, and M. A. Holzman. 1981, 6p CONF-810429-16
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

A new technique is discussed for signal strength enhancement of high-frequency (>1 GHz), spectrally-broad, analog signals through 1 km of optical fiber. The conventional method for optical measurement of high-frequency gamma ray signals is to use an optical fiber placed in the gamma radiation beam as a Cerenkov transducer. The radiation-induced optical signal is degraded by material dispersion in transmission through the fiber. To reconstruct the signal (which is carried by each wavelength) and preserve the high-frequency components, a narrow-band filter selects an appropriate bandwidth (1 nm). The filtered signal is detected using a high-speed, microchannel-plate (MCP) photomultiplier detector and recorded on high-speed oscilloscopes. (ERA citation 06:022420)

LA-UR-81-1074 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Ultraviolet-Spectrograph Lens.
B. Brixner, and M. A. Winkler. 1981, 10p CONF-810429-10
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

A 700-mm f/4.7 spectrograph camera lens was designed for imaging spectral lines in the 200- to 400-nm region on a 120-mm flat image field. Lens elements of fused silica and crystal calcium fluoride give such good achromatization that raytrac-

ing calculations predict a resolution limit of 30 lines/mm without refocusing in the 238- to 365-nm region. Light scattering at the polished calcium-fluoride surfaces is avoided by sandwiching the fluoride elements between fused silica and cementing with silicone fluid. The constructed lens makes good spectrograms. (ERA citation 06:022519)

LA-UR-81-1565 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Ultraviolet Phase Conjugation and Its Practical Implications.
B. J. Feldman, R. A. Fisher, and S. L. Shapiro.
1981, 6p CONF-810429-23
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

We report the first demonstration of uv phase conjugation. Using a 15 psec, 2660 A pulse, 0.1% conjugate reflectivities were obtained via degenerate four-wave mixing in 1-mm samples of CS sub 2 mixtures. While pure CS sub 2 did not exhibit the effect, dilution in several uv transmitting solvents opened up a concentration-tunable (2450 A to 2850 A) spectral window, allowing the optical Kerr effect to be utilized. Weaker phase conjugation at 2660 A was also observed in other Kerr media and in saturable absorber media. (ERA citation 06:022435)

PB81-220436 Not available NTIS
National Bureau of Standards, Washington, DC.
Analytic Solutions for Three- and Four-Wave Mixing Via Generalized Bose Operators.
Final rept.,
J. Katriel, and D. G. Hummer. 1981, 14p
Pub. in Jnl. of Physics, A, Mathematical and General 14, p1211-1224 1981.

New types of generalized Bose operators are constructed. They are applied to the linearization of the equations of motion describing three- and four-wave mixing, resulting in integral equations for the temporal behaviour of the various fields. Some mathematical properties of these integral equations are studied, thus establishing the equivalence between approahes differing in the manner in which the linearization is carried out. The integral equations are solved analytically in terms of Jacobian elliptic functions.

PB81-870966 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aspherical Lenses: Preparation and Applications. January, 1975-July, 1981 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for Jan 75-Jul 81.
Jul 81, 121p

The applications of aspherical lenses to holographic and infrared devices, as well as to fiber optics, ultrasonics, and lasers, are considered. Special emphasis is placed on solar collectors. Methods for lens and mirror preparation are also included. (Contains 110 citations fully indexed and including a title list.)

20G. Particle Accelerators

AD-A100 936/4 PC **A02**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
The Space-Charge Resonance Accelerator.
Final rept.,
Han S. Uhm, and Joon Y. Choe. 1 Apr 81, 18p
Rept no. NSWC/TR-81-137

The space-charge resonance accelerator (SRA) consists of a relativistic electron beam propagation through a dielectric loaded drift tube. In a range of physical parameters, the phase velocity of a self-growing space-charge wave increases slowly from zero to a large beam velocity as it propagates into the downstream region, thereby trapping and accelerating ions by its electric field. The self-growing mechanism of the space-charge wave is a typical Cherenkov radiation. (Author)

BNL-29243 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
RELWAY: A Process Data Highway System Optimized for Accelerators.
R. Frankel, W, Buxton, K. Kohler, R. Warkentien, and A. White. 1981, 3p CONF-810314-62
Contract AC02-76CH00016
Particle accelerator conference, Washington, DC, USA, 11 Mar 1981.

The command/control scheme for the Isabelle accelerator, specifically the process data highway are discussed. (GHT)J. (ERA citation 06:022481)

DE81023410 PC **A02**/MF **A01**
Columbia Univ., Irvington-on-Hudson, NY. Nevis Labs.
Study of Electron Target Experiment. Annual Progress Report, July 1, 1980-June 30, 1981.
W. Lee, and R. R. Wilson. Apr 81, 8p DOE/ER/10716-T1
Contract AC02-80ER10716
Microfiche only after original copies are exhausted.

A design is discussed for a 10 to 15 GeV electron storage ring capable of satisfying the following criteria: a luminosity of 4 x 10 exp 31 cm exp -2 sec exp -1 for collisions between 10 GeV electrons and 1000 GeV protons; the option of colliding either e exp + or e exp - of either helicity; a positron filling time of less than 10 minutes; a free space of +- 6.5 m at the interaction point; the construction and installation to interfere minimally with the commitments of Fermilab; and a minimal impact on the operation and control of the proton beam when not running in the e-p colliding mode. (ERA citation 06:024095)

DOE/ER/01388-488 PC **A02**/MF **A01**
Washington Univ., Seattle. Nuclear Physics Lab.
Investigation of Periodic Acceleration Tube Discharges with a Capacitive Pickup Array.
T. A. Trainor. 1981, 3p CONF-810468-4
Contract AC06-76ER01388
International conference on electrostatic accelerator technology, Oak Ridge, TN, USA, 13 Apr 1981.

Several diagnostic techniques are described, which were used to determine the cause of periodic tube discharges and consequent fast terminal voltage drops in an FN tandom accelerator which were observed to occur at high beam intensities for the voltage range 7 to 9 MV. Terminal voltage drops were first monitored with a generating voltmeter (GVM). As a result of this study it was decided to install an array of four capacitive pickups (mushrooms) along the length of the pressure vessel. Information obtained from these pickups and analysis of beam fluctuation data permitted the source of the difficulty to be identified as a high transmission grid installed at the entrance to acceleration tube 1. (ERA citation 06:022466)

DOE/ER/05911-T1 PC **A04**/MF **A01**
Austin Research Associates, Inc., TX.
Design Study for a High-Current, Steady-State Auto-Resonant Accelerator. Addendum to Final Report, July 14, 1979-November 14, 1979.
W. E. Drummond. 1979, 60p COO-5911-5
Contract AC05-78ER05911

A number of potential applications for the auto-resonant accelerator (ARA) are discussed. The potential uses are divided into two categories: the use of the ARA in energy or fuel production cycles which would gave significant energy policy ramifications, and miscellaneous research, medical and industrial use of the ARA which may be attractive. The output parameters, cost and size data are summarized to provide a basis for judging potential uses. The use of ARA for the production of fissile material is discussed, as is its use as a plasma heating device for tokamak experiments or potential fusion reactors. (ERA citation 06:022484)

LA-tr-80-10 PC **A17**/MF **A01**
Los Alamos Scientific Lab., NM.
Particle Dynamics in Linear Resonance Accelerators.
I. M. Kapchinskii. 1980, 386p
Contract W-7405-ENG-36
C Dinamika chastits v lineinykh rezonansnykh uskoriteliakh; Atomizdat, Moscow, USSR, 1966.

Topics covered include: longitudinal particle oscillation in beams with negligibly low space-charge density; transverse particle oscillation in beams with negligibly low space-charge density; transverse particle oscillations in beams with high space charge density; and longitudinal oscillations of particles in beams with high space-charge density. (ERA citation 06:022480)

LBL-11709 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Use of a Small off-Line Computer in the Operation of a Versatile Heavy Ion Cyclotron.
R. A. Gough. Mar 81, 6p CONF-810314-158
Contract W-7405-ENG-48
Particle accelerator conference, Washington, DC, USA, 11 Mar 1981.

In a modern heavy ion cyclotron with variable energy and particle species, it is essential to provide the operations staff with fast and easy access to parameter information. At the Berkeley 88-Ion Cyclotron, which operates under manual control, an interactive computer program has been developed to meet this requirement. The program is written in BASIC on a small off-line computer to perform a variety of calculations for any ion species and energy. The program can provide the operator with cyclotron and beam line settings for any beam, regardless of whether or not the beam has been previously run, by utilizing the broad data base acquired over a decade of heavy ion operation. A number of additional calculations now being performed conveniently and routinely by the operations staff will be discussed. The use of this program has greatly streamlined the operation of the cyclotron because needed information can be obtained quickly and reliably. (ERA citation 06:022487)

LBL-11713 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Simplified RF Power System for Wideroe-Type Linacs.
J. Fugitt, D. Howard, F. Crosby, R. Johnson, and M. Nolan. Mar 81, 6p CONF-810314-159
Contract W-7405-ENG-48
Particle accelerator conference, Washington, DC, USA, 11 Mar 1981.

The RF system for the SuperHILAC injector linac was designed and constructed for minimum system complexity, wide dynamic range, and ease of maintenance. The final amplifier is close coupled to the linac and operates in an efficient semi-linear mode, eliminating troublesome transmission lines, modulators, and high level regulators. The system has been operated at over 250 kW, 23 MHz with good regulation. The low level RF electronics are contained in a single chassis adjacent to the RF control computer, which monitors all important operating parameters. A unique 360 exp 0 phase and amplitude modular is used for precise control and regulation of the accelerating voltage. (ERA citation 06:022488)

LBL-11726 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Metallic Wedge Degraders for Rapid Energy Measurement of Bevalac Heavy Ion BEAMS.
R. Wada, and J. R. Alonso. Mar 81, 4p CONF-810314-143
Contract W-7405-ENG-48
Particle accelerator conference, Washington, DC, USA, 11 Mar 1981.

An ever-present need in an accelerator-based research program is knowing the energy of the beam delivered to the experimenter. Knowledge of accelerator parameters is generally good enough to predict the beam energy to within a few percent as it leaves the machine, but after passage through a complex switchyard, with air gaps, and non-destructive monitors, substantial changes in the energy can occur. Knowledge of the material in the beam path allows for calculations of expected energy loss, but this knowledge is not always complete, and the unforeseen often plays tricks on the unwary experimenter; for example, a section of beam-pipe inadvertently let up to air, or a monitor left in the beam-line from the previous run. Although such occurrences are rare, to say they do not happen would be grossly inaccurate. The only defense of the experimenter, then, is to have an accurate technique for determining the beam energy at his target location, a technique which re-

quires little beam time and which is non-disruptive of his experimental setup. The device described meets all of these criteria, and is now used extensively in the Nuclear Science and Biomedical programs at the Bevalac. (ERA citation 06:022469)

LBL-12552 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Design of Focussing and Guide Structures for Charged Particle BEAMS Using Rare Earth Cobalt Permanent Magnets.
K. Halbach. Jun 81, 10p CONF-810644-1
Contract W-7405-ENG-48
International workshop on rare earth-cobalt magnets and their application, Dayton, OH, USA, 6 Jun 1981.

A number of different methods can be used to describe the magnetic properties of oriented Rare Earth Cobalt (REC) material. It will be shown how these different methods of description lead to different ways to think about, and to execute, the design of magnets that are useful for focusing and guiding charged particle beams. It will also be domonstrated that in some of these magnets, the REC material is used in a somewhat unusual way, requiring magnetics properties of the material that are usually not considered to be of great practical importance. (ERA citation 06:022492)

PB81-223208 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
A Universal Solid Ion Source.
Technical rept.,
J. Richards. Oct 80, 27p ERL-0175-TR, AR-002-060

An ion source capable of generating ions from a wide range of normally solid materials is described. The source operates by focussing a powerful electron beam onto a molten target, the electrons serving to both vaporize and ionize atoms of the target. The ion beam drawn from the source possesses many desirable properties, including a low energy spread, very high purity, and high brightness.

SLAC-PUB-2677 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Wigglers: The Newest Profession.
J. E. Spencer. 1981, 7p CONF-810340-11, PEP-NOTE-341
Contract AC03-76SF00515
International conference on magnet technology, Karlsrube, F.R. Germany, 30 Mar 1981.

Wiggler systems have been used in storage rings within the last year to increase the intensity of synchrotron radiation available for experiments as well as to increase the reaction rates in high energy physics experiments. Multiperiod wigglers or undulators have also been used recently to make quasi-monochromatic photon beams as well as amplify existing photon beams such as in the free electron laser. If one defines a wiggler to be any system of transverse, periodic electromagnetic fields, then recent results on photon production via charged particle channeling in crystals also fall within this sphere. Of course, any periodic modulation of a charge or magnetic moment (e.g., by a laser) could produce coherent radiation or, conversely, passage through a periodic aperture (e.g., a metal bellows). This discussion is limited to a typical, active, macroscopic device and how it provides some unique advantages which are practical to achieve in storage rings. As implied, the subject divides into two basic parts - one related to the radiation from the wiggler and the other related to machine physics applications, e.g., tailoring the phase space of the particle beam, modifying its damping rates or possibly optimizing a ring for production of radiation. Neither area is exhausted nor hopefully the reader, since our goal is only to present enough information to allow one to make reasonable estimates of some important effects. (ERA citation 06:022495)

UCRL-83993 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Overview of the ETA/ATA Pulse Power.
L. L. Reginato, and R. E. Hester. 30 May 80, 4p CONF-800640-21
Contract W-7405-ENG-48
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

A pulsed electron accelerator has been constructed and is now in operation at the Lawrence Livermore Laboratory. This Experimental Test Accelerator (ETA) a 5 MeV, 10 kA, 50 ns FWHM, five pulse burst at 1 kHz, was designed to be the front end or injector for the Advanced Test Accelerator (ATA). The ATA is presently under construction and will have the following parameters: beam energy - 50 MeV, beam current - 10 kA, pulse length - 70 ns, repetition rate in a ten pulse burst - 1 kHz. The parameters which make the pulse power components unique for these machines are the high repetition rate in a burst and a high degree of regulation in the system to insure pulse to pulse repeatability. Because of the larger number of components requird for ATA, a much higher degree of reliability will be required. Improvements and modifications continue to be made on the ETA, which is serving as a base of development for all ATA pulse power components. Furthermore, all ATA pulse power components will be tested at length in a test stand before beginning mass production to insure proper design to meet voltage, current, rep-rate and life requirements. (ERA citation 06:022505)

20H. Particle Physics

BNL-29465 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Highlights of High Energy Pp, Anti Pp and E exp + E exp - Interactions.
L. C. Wang. 1981, 40p CONF-810246-3
Contract AC02-76CH00016
Z/sup o/ physics workshop, Ithaca, NY, USA, 6 Feb 1981.

Topics covered include: the production cross sections of W/sup +-/ and Z exp 0 ; the detection of the Z exp 0 and W/sup +-/; some detailed features of the Drell-Yan model; the onia production; and the Higgs boson and technicolor pseudo scalar production. e exp + e exp - interactions are compared with the pp and p-anti p interactions. (ERA citation 06:022817)

LA-UR-81-1510 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
870.8-KeV gamma Ray from PuO sub 2.
H. H. Hsu. 1981, 12p CONF-810647-5
Contract W-7405-ENG-36
Conference on X- and gamma-ray sources and applications, Ann Arbor, MI, USA, 10 Jun 1981.

A exp 252 Cf neutron source and an exp 241 Am alpha source were used with isotopically enriched water containing 43.9% exp 17 O and 43.1% exp 18 O, to study the (n,n'UPSILON) and (alpha , alpha 'UPSILON) reactions in exp 17 O and exp 18 O. The production yields for the 870.8-keV gamma ray from exp 17 O and the 1982.2-keV gamma ray from exp 18 O were measured. In addition, the average cross sections over the exp 252 Cf fission neutron spectrum for exp 17 O(n,n'UPSILON) exp 17 O and exp 18 O(n,n'UPSILON) exp 18 O were determined. (ERA citation 06:021696)

LA-UR-81-1555 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Kernphysik, Heidelberg (Germany, F.R.).
Nuclear Equation of State Studied with High-Energy Heavy Ions.
J. R. Nix, and D. Strottman. 1981, 24p CONF-810563-1
Contract W-7405-ENG-36
Adriatic europhysics study on nuclear physics dynamics of heavy-ion collisions conference, Croatis, Yugoslavia, 25 May 1981.

The current knowledge and theoretical speculations concerning the nuclear equation of state is discussed. Conventional relativistic nuclear fluid dynamics, which is based on the assumption that the nucleon mean free path is zero and consequently neglects the interpenetration of the target and projectile upon contact, is also discussed. Results of such calculations performed for three different equations of state are compared with experimental data for both all impact parameters and central collisions for the reaction exp 20 Ne + exp 238 U at a laboratory bombarding energy per nucleon of 393 MeV. These comparisons suggest that we need to take into account target and projectile interpenetration, which is done on the basis of a two-fluid model. An assessment of the present status and future prospects for determining the nuclear equation of state with high-energy heavy ions is given. (ERA citation 06:022854)

PB81-221681 Not available NTIS
National Bureau of Standards, Washington, DC.
Study of the Giant Resonances with Virtual and Real Photons.
Final rept.,
E. Hayward. 1979, 11p
Proceedings of the International Conference on Nuclear Physics with Electromagnetic Interactions held at Mainz, Germany on June 5-9, 1979.
Pub. in Lecture Notes in Physics 108, p300-310 1979.

The relationship between inelastic electron scattering and electrodisintegration is discussed, and the definition of the virtual photon spectrum is introduced. Several tests of the E1 virtual photon analysis are cited. The results of the (e,p) and (e, alpha) experiment on the nickel isotopes are discussed, and evidence for the failure of the long wavelength approximation for E2 excitations is presented. A short review of the electrofission experiments follows.

SLAC-PUB-2674 PC **A02**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Physics.
Internal Spin Structure of the Proton from High Energy Polarized E-p Scattering.
V. W. Hughes, G. Baum, and M. R. Bergstroem.
Feb 81, 14p CONF-800994-13
Contract AC03-76SF00515
International symposium on H.E. physics with polarized beams and polarized targets, Lausanne, Switzerland, 25 Sep 1980.

A review is given of experimental knowledge of the spin dependent structure functions of the proton, which is based on inclusive high energy scattering of longitudinal polarized electrons by longitudinally polarized protons in both the deep inelastic and resonance regions, and includes preliminary results from our most recent SLAC experiment. Implications for scaling, sum rules, models of proton structure, and the hyperfine structure interval in hydrogen are given. Possible future directions of research are indicated. (ERA citation 06:022825)

20I. Plasma Physics

AD-A100 623/8 Not available NTIS
Northwestern Univ., Evanston, IL. Dept. of Mechanical Engineering and Astronautical Sciences.
A Linearized 3D Hybrid Code for Stability Studies of Field-Reversed Ion Rings,
Alex Friedman, R. N. Sudan, and J. Denavit. 22 May 79, 35p
Contracts N00014-75-C-0473, EY-76-S-02-3170
Prepared in cooperation with Cornell Univ., Ithaca, NY., Lab. of Plasma Studies., Sponsored in part by contract EY-76-S-02-2200.
Availability: Pub. in Jnl. of Computational Physics, v40 n1 p1-35 Mar 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 653/5 PC **A14**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Discharge Processes in the Oxygen Plasma.
Final rept. Oct 75-Oct 80,
John W. Dettmer. Apr 81, 312p Rept no. AFWAL-TR-80-2120

The electric glow discharge in oxygen was experimentally studied and mathematically modeled for the parameter space of one to ten torr of pressure and for current densities up to 35 milliamperes per square centimeter. Experimentally it was observed that the oxygen discharge existed in one of two forms: a high-electric-field form or a low electric-field form. The high field form was present at high

currents and low pressures, the low field form at low currents and high pressures. The high field form exhibited stable characteristics while the low field form was observed to be nonstable, exhibiting periodic or aperiodic oscillatory behavior. The periodic oscillations existed only at certain frequencies or modes, and the discharge impedance was a function of the frequency. The optical output of the oscillatory form of the discharge was highly modulated with short duty cycle pulses. The oscillations exhibited a small amount of normal disposition. The point of transition between forms and the electrical impedance of the forms was unaffected by the addition of an inert gas, argon, to the discharge. Adding an electron-detaching gas, carbon monoxide, increased the low field impedance until the difference between the forms essentially ceased to exist. Mass spectra measurements indicated that the atomic oxygen density increased significantly when the discharge transitioned from the low to high field forms. Solutions of the Boltzmann transport equation indicated that the electron energy distribution function exhibited a characteristic intermediate between Maxwellian and Druyvesteyn.

AD-A100 802/8 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Resonance Absorption of Laser Light by Warm and Cold Plasmas.
Master's thesis,
John H. Ruble, Jr. Mar 81, 161p Rept no. AFIT/GNE/PH/81-9

This is a study of the mechanisms and results of resonance absorption in warm and cold plasmas. Maxwell's equations and the plasma fluid equations (neglecting ion motion and assuming wavelike solutions in the x-direction) are linearized. The linearization is accomplished for a plasma with a positive number density gradient in the z-direction. Second-order equations are derived from the linearized set. These second-order equations are differenced and solved in the z-direction for the TM mode of propagation using a two-sweep algorithm with zero and radiation boundary conditions. The characteristics of the field quantities are investigated at various temperatures. Further N sub 1 (the plasma wave), the temperature of the hot electrons, and the nonlinear Ponderomotive force are calculated. Finally, resonance absorption by the plasma is calculated and peak absorptions of 50% are observed for both cold and low temperature warm plasmas. The validity of the assumptions is discussed referencing both power and temperature concerns. Possible nonlinear and time-dependent modifications to the theory are discussed. Landau damping is derived and its limitations considered. The two-sweep algorithm is found to give accurate results and its amenability to computer application makes it a desirable method. (Author)

AD-A101 144/4 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Finite Element Method Applied to the System-Generated Electromagnetic Pulse Boundary Layer.
Doctoral thesis,
John A. Gaudet. Feb 81, 147p Rept no. AFIT/DS/PH/81-1

The Finite Element Method was used to solve the nonlinear electron plasma equations for the System-Generated Electromagnetic Pulse boundary layer in one spatial dimension. These equations were solved in distance-velocity phase space using a rectangular finite element mesh. Linear approximations were used for both the trial and weight functions for each element. The advection terms in the Vlasov plasma equation were treated with the Heinrich upwinding technique. The time integration was performed using an explicit two-step Lax-Wendroff procedure. The system of algebraic equations were solved with a fully-packed Gauss-Seidel iteration scheme. A value of 2/3 for the upwinding parameter was found to provide the best compromise between dispersion of the pulse, and computer storage requirements. The savings in computer memory results in increased execution speed for the algorithm. Also, it is shown that the numerical scheme does not permit spurious pulse reflections from the edges of the mesh. Results for several test cases are presented. Comparisons are given which show favorable agreement for the finite element technique with other solution relationships.

DOE/ER/10376-T1 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Studies of Autoionizing States Relevant to Dielectronic Recombination. Progress Report for the Third Year.
T. F. Gallagher. 5 Jan 81, 22p
Contract AT03-79ER10376

An important loss process in CTR plasmas is the process of dielectronic recombination, which proceeds via autoionizing states. At this date, however, this problem is not fully understood, largely because of the nearly complete lack of fundamental atomic data on high excited autoionizing states. In this document, we outline the continuation of a program to investigate the properties of autoionizing states of alkaline earth metals by means of a novel laser excitation technique developed at SRI. This approach will allow us to study, for the first time, autoionizing states of arbitrary n, and l in a controlled environment. Specifically, we plan to measure autoionization rates and branching ratios as a function of n and l and the effects of electric fields. These experiments should yield the basic atomic data, autoionization rates, required as inputs to sophisticated model calculations of dielectronic recombination rates. (ERA citation 06:024553)

DOE/ET/53018-3 PC **A13**/MF **A01**
Pennsylvania State Univ., University Park.
Transient Loss of Plasma from a theta Pinch Having an Initially Reversed Magnetic Field.
J. E. Heidrich. Jan 81, 282p
Contract AS02-76ET53018

The results of an experimental study of the transient loss of plasma from a 25-cm-long theta pinch initially containing a reversed trapped magnetic field are presented. The plasma, amenable to MHD analyses, was a doubly ionized helium plasma characterized by an ion density N/sub i/ = 2 x 10 exp 16 cm exp -3 and an ion temperature T/sub i/ = 15 eV at midcoil and by N/sub i/ = 0.5 x 10 exp 16 cm exp -3 and T/sub i/ = 6 eV at a position 2.5 cm beyond the end of the theta coil. (ERA citation 06:024554)

LA-UR-81-1435 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Optical Diagnostics of CO sub 2 Laser-Fusion Targets Using Backscattered Light.
D. E. Casperson. 1981, 15p CONF-810429-26
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

With the f/2.4 focusing optics on one of the eight Helios CO sub 2 laser beam lines, direct backscattered light from a variety of glass microballoon targets has been observed. The quantities that have been measured include: (1) the total backscattered energy; (2) relative amplitudes of the backscattered fundamental and low harmonics (n = 1, 2, 3) of the 10.6 mu m incident light; (3) the 3/2 harmonic emission from a double pulse backscatter experiment; (4) the temporally resolved 10.6 mu m light using a fast pyroelectric detector and a Los Alamos 5-GHz oscilloscope; and (5) the time-integrated spectrally resolved fundamental using a 3/4 meter spectrometer and a high resolution pyroelectric detector array (resolution approx. 40 A at 10.6 mu m). The suitability of these diagnostics for evaluating the CO sub 2 laser plasma in terms of stimulated scattering processes, plasma density gradients, velocity of the critical surface, etc., is discussed. (ERA citation 06:022881)

LA-UR-81-1442 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Position Diagnostics for a Magnetic-Pinch Imploding-Cylinder X-Ray Generator.
J. D. Seagrave, C. W. Woods, and L. A. Jones. 1981, 6p CONF-810429-32
Contract W-7405-ENG-36
Conference on optics, Santa Fe, NM, USA, 6 Apr 1981.

For the diagnostic instrumentation of an imploding cylindrical plasma intended as a prototype for a high-intensity flash x-ray source, two systems have been developed which employ batteries of inexpensive 1.2-ns (FWHM) nitrogen lasers fired in sequence during the approx.2- mu s period of the implosion. Four pinhole-schlieren paraxial photographs are taken, and eight radial profiles are obtained using a novel position-sensitive detector based on a fluorescent plastic-fiber optical delay line. (ERA citation 06:024560)

20J. Quantum Theory

PB81-220295 Not available NTIS
National Bureau of Standards, Washington, DC.
Glueballs: Their Spectra, Production and Decay.
Final rept.,
S. Meshkov. 1980, 17p
Pub. in Paper in Recent Developments in High-Energy Physics, p43-59 1980.

A systematic enumeration of the glueball spectrum of QCD and other SU(n) gauge theories yields JPC=odd(-+), even(+-), and 0(--) states in addition to the usual quark model states. Production and decay mechanisms for these new state are addressed. We obtain a significant radiative decay width of the psi/J into a 0(-+) glueball via mixing with the (eta sub c).

20K. Solid Mechanics

AD-A100 861/4 Not available NTIS
Naval Research Lab., Washington, DC. Shock and Vibration Information Center.
The Shock and Vibration Digest. Volume 13, Number 6,
Ronald L. Eshleman, and Judith Nagle-Eshleman. Jun 81, 98p
Availability: Naval Research Lab., Attn: Code 5804. Washington, DC 20375. Annual Rate $100.00 (No copies furnished by DTIC).

Partial Contents: Dynamic Response of Fluid-Filled Shells - An Update; Vibrations of Conical Shells; and Abstracts from the Current Literature.

AD-A100 944/8 PC **A05**/MF **A01**
California Univ., Berkeley. Center for Pure and Applied Mathematics.
Symmetry and Bifurcation in Three Dimensional Elasticity. Part I.
Interim rept.,
D.R.J. Chillingworth, J. E. Marsden, and Y. H. Wan. Apr 81, 78p PAM-36, TR-3, ARO-16567-9-M
Contract DAAG29-79-C-0086, Grant NSF-MCS78-06718
Revision of report dated Sep 79. Prepared in cooperation with Southhampton Univ. (England). Dept. of Mathematics and State Univ. of New York, Buffalo. Dept. of Mathematics.

The purpose of this paper is to study the traction problem in three dimensional nonlinear elasticity using geometric techniques and singularity theory. The first two papers in the series deal with dead loads and configurations that are nearly stress free. As was shown by Signorini (1930) and Stoppelli (1958), this problem has nontrivial solutions. However, their analysis is incomplete for three reasons. First, their load was varied only by a scalar factor; in a full neighborhood in load space of a load which has an axis of equilibrium there are additional solutions missed by their analysis. Second, their analysis is only local in the rotation group, so additional nearly stress free solutions are missed by restricting to rotations near the identity. Third, some classes of loads with a degenerate axis of equilibrium were not considered. This paper completes their analysis by treating these questions as well as stability. The complexity of the answer is indicated by the fact that near certain types of loads, we find up to 40 distinct solutions that are nearly stress free. Our constitutive hypotheses on

the stress tensor are 'generic'; for a degenerate stress tensor there can be even more solutions.

N81-26491/3 PC **A21**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
Finite-Element Nonlinear Transient Response Computer Programs PLATE 1 and CIVM-PLATE 1 for the Analysis of Panels Subjected to Impulse or Impact Loads.
R. L. Spilker, E. A. Witmer, S. E. French, and J. J. A. Rodal. Sep 80, 497p NASA-CR-165215, ASRL-TR-154-14
Contract NGR-22-009-339

Two computer programs are described for predicting the transient large deflection elastic viscoplastic responses of thin single layer, initially flat unstiffened or integrally stiffened, Kirchhoff-Lov ductile metal panels. The PLATE 1 program pertains to structural responses produced by prescribed externally applied transient loading or prescribed initial velocity distributions. The collision imparted velocity method PLATE 1 program concerns structural responses produced by impact of an idealized nondeformable fragment. Finite elements are used to represent the structure in both programs. Strain hardening and strain rate effects of initially isotropic material are considered.

N81-26493/9 PC **A03**/MF **A01**
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
Effective Constitutive Relations for Large Repetitive Frame-Like Structures.
Semiannual Progress Report, period ending 30 Apr. 1981.
A. H. Nayfeh, and M. S. Hefzy. 1981, 33p NASA-CR-164521
Grant NSG-1185

Effective mechanical properties for large repetitive framelike structures are derived using combinations of strength of material and orthogonal transformation techniques. Symmetry considerations are used in order to identify independent property constants. The actual values of these constants are constructed according to a building block format which is carried out in the three consecutive steps: (1) all basic planar lattices are identified; (2) effective continuum properties are derived for each of these planar basic grids using matrix structural analysis methods; and (3) orthogonal transformations are used to determine the contribution of each basic set to the overall effective continuum properties of the structure.

PB81-222846 PC **A05**/MF **A01**
National Physical Research Lab., Pretoria (South Africa).
Formulae for the Homogeneous Isotropic Perfectly Linear Elastic Continuum,
H. G. Denkhaus. Jul 80, 83p CSIR-ME-1665, ISBN-0-7988-1469-1

This is the second, corrected and extended edition of a collection of formulae which was compiled to provide a reference manual of the basic equations of the classical theory of elasticity. It is believed that this systematic collection will be useful for the engineer and the student when reading papers related to elasticity, where the authors obviously cannot go back to the fundamentals but must assume that the reader has a basic knowledge of the theory.

20L. Solid-State Physics

AD-A100 595/8 PC **A02**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Magnetostriction and Characterization of Bridgman Grown Rare-Earth Iron Alloys.
Technical rept.,
H. T. Savage, R. J. Abbundi, and A. E. Clark. 1 Nov 80, 19p Rept no. NSWC/TR-81-29

We have prepared large samples of Tb 0.27Dy 0.73Fe2 and Tb 0.2Ho 0.58Dy 0.22Fe2 by a Bridgman-like technique developed at United Technology. The samples have much larger values of saturation magnetostriction than vertically zoned materials. The materials have been characterized by metallographic x-ray and TEM studies. (Author)

AD-A100 645/1 PC **A02**/MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ. Electronics Technology and Devices Lab.
Annealing of Boron-Implanted Silicon by a Heat-Assisted Noncoherent Light Flash.
Technical rept.,
H. A. Bomke, H. L. Berkowitz, M. Harmatz, S. Kronenberg, and R. Lux. May 81, 7p Rept no. DELET-TR-81-13

High quality annealing of boron implanted silicon 10 to the 15th power/sq cm, 50 keV) was achieved using commercially available quartz xenon flash tubes after a 20 second preheat. Electrically active dopant profiles, obtained from spreading resistance profiles, indicate that the annealing proceeded by solid phase epitaxy. We also find that the degree of boron redistribution can be controlled by the cumulative exposure to the flash. Characteristics of the apparatus used suggest that annealing 3 inch diameter wafers with a throughput of 3 wafers per minute is feasible. (Author)

AD-A100 718/6 PC **A02**/MF **A01**
State Univ. of New York at Albany. Dept. of Physics.
Ion-Induced Defects in Semiconductors,
James W. Corbett, James P. Karins, and Teh Y. Tan. 1981, 21p
Contract N00014-75-c-0919
Pub. in Nuclear Instruments and Methods, v182/183 p457-476 1981.

No abstract available.

AD-A100 727/7 PC **A02**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Studies of Unexfoliated and Exfoliated Intercalation Graphite.
Technical rept.,
W. L. Garrett, J. Sharma, J. Pinto, and H. Prask. May 81, 15p ARLCD-TR-81008, AD-E400 617

The ongoing study of unexfoliated and exfoliated intercalation graphite is directed towards the understanding of its physical nature, to determine what changes take place when it is exfoliated into a low density solid, and to explore its potential as an obscurant. X-ray photoelectron spectroscopy (XPS) is used for studying the electronic levels; X-ray diffraction is used for crystallographic information, while optical reflectivity is measured to determine its spectral response. It has been found that even after exfoliation the material remains essentially graphite.

AD-A100 778/0 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
System Optimization of the Glow Discharge Optical Spectroscopy Technique Used for Impurity Profiling of Ion Implanted Gallium Arsenide.
Master's thesis,
Paul J. Apuzzo. Dec 80, 73p Rept no. AFIT/GEO/EE/80D-1

The glow discharge optical spectroscopy (GDOS) technique was investigated to determine if the sensitivity of the system could be improved. GDOS was applied to determine impurity concentration profiles of annealed and unannealed ion implanted GaAs samples. Modifications were made to the sputtering chamber and the light collection systems which resulted in a 3.7 times increase in system sensitivity. Comparisons were made to previous studies by sputtering GaAs samples implanted with Ge at energies of 90 keV and 120 keV and fluences of 5 x 10 to the 14th power/sq cm and 10 to the 15th power/sq cm. The implanted samples were sputtered in a low pressure argon gas discharge. Intensity of a strong emission line, characteristic of the implanted impurity, was monitored as a function of time. Profiles of Ge implanted GaAs were measured and analyzed. (Author)

AD-A100 845/7 Not available NTIS
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
Dynamics of Pulsed CO2 Laser Annealing of Silicon,
Anjan Bhattacharyya, and B. G. Streetman. 23 Feb 81, 7p ARO-16849.9-EL
Contract DAAG29-80-C-0011
Availabilty: Pub. in Jnl. of Physics D: Applied Physics, v14 pL67-L72 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 848/1 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Assessment of Superconductivity Enhancement Claimed to Occur in Small Particle-Normal Metal Matrix Composite Superconductors,
M. Ashkin. 20 Feb 78, 36p
Contract F49620-78-C-0031

The claims of substantially enhanced superconducting transition temperature, T sub c, and upper critical field, H sub c2, are judged implausible. This conclusion was reached by comparing the claims with what is theoretically expected using current theories, experimental results, and concepts of superconductivity of high-T sub c material. However, the Battelle approach holds some promise of achieving both good mechanical and good superconducting properties in a practical conductor. AC losses and proximity effects in the composites need careful consideration in the evolution of a practical composite conductor. (Author)

AD-A100 908/3 Not available NTIS
Polytechnic Inst. of New York, Farmingdale. Microwave Research Inst.
Reflectance Changes of Metals during Laser Irradiation,
William T. Walter. 1979, 10p
Contracts N00014-78-C-0678, F44620-74-C-0056
Availability: Pub. in Proceedings of SPIE, v198-Laser Applications in Materials Processing, P109-117 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A100 911/7 PC **A04**/MF **A01**
Colorado Univ., Boulder. Dept. of Electrical Engineering.
Properties and Applications of GaInAsP.
Final rept.,
Russell E. Hayes. 20 Mar 81, 51p
Contract N00014-75-C-0472

This research program involved the investigation of several aspects of GaxInl-xAsy-Pl-y, grown by LPE, that are of importance to the potential use of this material for field effect transistors, transferred-electron oscillators, and other devices. Results obtained include: various electrical characteristics of the material; the observation that the GaInAsP-InP conduction band discontinuity was less than 60 meV for these junctions; the characteristics of some quaternary transferred electron oscillators; and the properties of anodic oxides grown on the quaternary.

AD-A100 913/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Energy-Dependent Electron-Energy-Loss Spectroscopy: Application to the Surface and Bulk Electronic Structure of MgO.
Journal article,
Victor E. Henrich, Gene Dresselhaus, and Herbert J. Zeiger. 23 May 80, 13p JA-5088, ESD-TR-81-29
Contract F19628-80-C-0002
Pub. in Physical Review B, v22 n10 p4764-4775, 15 Nov 80.

No abstract available.

AD-A101 023/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

Silicon Graphoepitaxy Using a Strip-Heater Oven.
Journal article,
Michael W. Geis, Donald J. Silversmith, Henry I. Smith, Dimitri A. Antoniadis, and Robert W. Mountain. 15 May 80, 4p JA-5112, ESD-TR-81-34
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v37 n5 p454-456, 1 Sep 80.

No abstract available.

AD-A101 043/8 PC **A03**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Spectroscopic Studies of the Electronic Structure of Metal-Semiconductor and Vacuum-Semiconductor Interfaces.
Final rept. 1 Dec 79-30 Nov 80,
Dean E. Eastman. 29 May 81, 43p AFOSR-TR-81-0547
Contract F49620-80-C-0025

The electronic structure and properties of semiconductor interfaces including both vacuum-semiconductor and metal-semiconductor interfaces as well as relevant metal and semiconductor materials have been investigated under this contract. The emphasis has been on elucidating the electronic properties of these materials and their interfaces, e.g., metal-semiconductor Schottky barriers, which are of far reaching importance in such semiconductor devices as MOSFETS, CCD devices, photovoltaic devices, etc. Extensive studies of the electronic structure of semiconductor surfaces and interfaces and related metal surfaces have been performed as a function of surface preparation (include laser annealing), doping, thickness of adsorbed overlayers, etc. The principle technique used has been photoelectron spectroscopy (XPS and UPS - with an emphasis on angle-resolved studies using synchrotron radiation and yield spectroscopy); other techniques include electron energy loss spectroscopy, low energy electron diffraction and theoretical band structure methods. Major achievements of our research program includes world-leading contributions to: (1) the electronic structure of cleaned and annealed Si(111) surfaces; (2) accurate experimental determinations of electron energy vs momentum band dispersions E(k) of selected materials (such E(K) dispersions are of central importance in solid state physics in understanding the electronic, physical and chemical properties of materials); and (3) the development and application of surface core level spectroscopy, a promising new photoemission technique.

AD-A101 120/4 PC **A02**/MF **A01**
Belfer Graduate School of Science, New York.
Piezo-Optical Determination of Deformation Potentials Relevant to Transport Properties Calculations of Multivalley Semiconductors.
Final rept.,
F. H. Pollak. 14 Aug 78, 24p
Contract N00014-76-C-0481

A piezospectroscopic investigation of the normalized wave-length-modulated absorption spectra of the phonon-assisted indirect exciton in Si (TO-phonon) and Ge (LA phonon) at 77 deg K has yielded values for the ratio of the electron-phonon to the hole-phonon matrix elements for the gamma-delta (Si) and gamma-L (Ge) transitions. (Author)

AD-A101 126/1 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Solid State Electronics Lab.
Semiconductor Oxide Interface States.
Final rept. 15 Sep 78-28 Feb 81,
C. T. Sah. May 81, 38p SSELUI-TR-45, AFOSR-TR-81-0546
Grant AFOSR-78-3714

This final report gives a summary of the experimental and theoretical studies undertaken during the two-year AFOSR grant on the electrical properties and atomic origins of oxide charges and interface states in the silicon oxide-silicon MOS structure. Both UV light and KeV electron are used to probe these interface and oxide states. MOS C-V, G-V and photo I-V measurements are performed under computer control. Experiments have shown that trivalent silicon and nonbridging oxygen are likely to be the principal atomic defects that are responsible for the presence of the interface states and oxide charges. Hydroxyl or hydrogen ions can tie up these dangling bonds and neutralize these atomic defects but bonded H and OH can be readily released by the electrons or holes generated by the 10.2 eV photons or KeV electrons. After the defects are generated, they can be neutralized readily by exposing the MOS capacitor to forming gas (4% H2 and 96% N2) at 390 C for 10 minutes. (Author)

AD-A101 167/5 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Electrical Engineering.
Investigation of Surface-Scattering Losses of III-V Compound Semiconductors.
Interim technical rept. 28 Sep 79-27 Mar 81,
Bansang W. Lee. 10 Jun 81, 15p AFOSR-TR-81-0529
Grant AFOSR-79-0136

Stages 1 and 2 of the proposed program were completed during the first 18 months of this effort. A satellite chamber for device fabrication was designed, built and incorporated into the main high vacuum chamber. The free surface properties of GaAs (110) and GaP (110) were studied using LEED and AES. Reports on this work were presented at scientific meetings. The problem of a wave propagating with losses in a rectangular waveguide was formulated and solved. (Author)

AD-A101 179/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
The Electrical Characteristics of InP Implanted with the Column IV Elements.
Journal article,
Joseph P. Donnelly, and Giusseppe A. Ferrante. 12 Feb 80, 5p JA-5051, ESD-TR-81-25
Contract F19628-80-C-0002
Pub. in Solid State Electronics, v23 n11 p1151-1154 1980.

No abstract available.

BNL-29558 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Computer Modeling of Cracks.
G. J. Dienes, and A. Paskin. 1981, 34p CONF-810584-1
Contract AC02-76CH00016
NATO advanced study institute on atomistics of France, Corsica, France, 22 May 1981.

The theoretical techniques used in modeling cracks in crystalline lattices are reviewed. It is shown that there is generally a trade-off between sample size and realistic interatomic potentials. The results of a recent molecular dynamic study of a two-dimensional triangular Lennard-Jones system of about 10,000 atoms are described. Static calculations on this system show very little lattice trapping in contrast to the often quoted results of lattice statics models. Using molecular dynamics, the properties of the system, with and without a crack, are understood sufficiently quantitatively to allow extrapolation to infinite size. At 10,000 atoms size effects are small enough to render the simulation highly reliable. It is also shown that when lattice statics and hybrid lattice statics calculations are performed using realistic, long-range potentials, lattice trapping is small. Dynamic simulations at constant applied stress show an intricate interplay between brittle crack propagation and the tendency to form dislocations. At low stresses the behavior is brittle while dislocation generation and crack blunting is observed at elevated stresses. The velocity of crack propagation has also been studied using a constant applied strain. A constant velocity is attained relatively soon after the crack has begun to propagate at both constant applied stress or strain. The credibility of the various models is discussed. (ERA citation 06:024003)

CONF-810146-1 PC **A02**/MF **A01**
IBM Watson Research Center, Yorktown Heights, NY.
Electronic Properties of Highly-Doped Si(111)-(1X1) Surfaces Prepared by Laser Annealing.
D. E. Eastman, P. Heimann, F. J. Himpsel, B. Reihl, and D. M. Zehner. 1981, 5p
Contract W-7405-ENG-26
Annual conference on the physics of compound semiconductor interfaces, Williamsburg, VA, USA, 27 Jan 1981, Portions of document are illegible.

Highly-degenerate n-type and p-type Si(111)-(1x1) surfaces have been prepared by As and B ion implantation and laser annealing, and studied using high resolution (approx. 0.1 to 0.2 eV) photoemission with synchotron radiation in the photon energy range 12 less than or equal to h/sub nu / less than or equal to 130 eV. (ERA citation 06:023948)

CONF-810566-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Generalization of the Nernst-Einstein Equation for Self-Diffusion in High-Defect-Concentration Solids.
R. A. McKee. 1981, 4p
Contract W-7405-ENG-26
International conference on fast ionic transport in solids, Gatlinburg, TN, USA, 18 May 1981.

It is shown that the Nernst-Einstein equation can be generalized for a high defect concentration solid to relate the mobility or conductivity to the self-diffusion coefficient. This relationship is derived assuming that the diffusing particles interact strongly and that the mobility is concentration-dependent. It is derived for interstitial disordered structures, but it is perfectly general to any mechanism of self diffusion as long as diffusion in a pure system is considered. (ERA citation 06:024516)

CONF-810573-1(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Theoretical Calculations of the Electronic and Vibrational Structure of Point Defects in Ionic Crystals.
R. F. Wood, and T. M. Wilson. 1981, 22p
Contract W-7405-ENG-26
International conference on defects in insulating crystals, Riga-Salaspils, USSR, 18 May 1981.

The structure of the Hartree-Fock one-electron equations for simple point defects in ionic crystals are discussed. The importance of polarization effects due to the diffuse nature of the wavefunctions in the relaxed excited states are emphasized, and the usefulness of an effective mass approximation indicated. Several approaches to the calculation of the electronic structure are discussed and evaluated. The connection between electronic structure calculations and phonon perturbations are pointed out through a brief discussion of localized perturbation theory. (ERA citation 06:024517)

DE81023997 PC **A02**/MF **A01**
Ames Lab., IA.
Fermi-Surface Properties of Mixed-Valent Materials.
G. W. Crabtree, W. R. Johanson, A. S. Edelstein, and O. D. McMasters. 1981, 4p IS-M-324, CONF-810129-4
Contract W-7405-ENG-82
Conference on valence fluctuations in solids, Santa Barbara, CA, USA, 27 Jan 1981.
Microfiche only after original copies are exhausted.

Data are presented for the study of mixed valent Fermi surface properties of CeSn sub 3 and LaSn sub 3 , and some qualitative implications for mixed valence in CeSn sub 3 are discussed. (ERA citation 06:023909)

DOE/ET/23037-3 PC **A02**/MF **A01**
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Determination of Pseudogap State Density and Carrier Mobility in RF Sputtered Amorphous Silicon. Quarterly Technical Progress Report, January-March 31, 1980.
W. Paul. Jun 80, 24p
Contract AC03-79ET23037

The effect of a variety of plasma cleaning procedures on the level of bulk and interfacial contaminants in the films is analyzed by secondary ion mass spectrometry. Bulk levels of 0 have been reduced considerably by N sub 2 plasma cleaning, but no reproducible reductions in interfacial contamination have been achieved. A method is described of determining the gap state density

N(epsilon) of a-Si:H from field effect, in which no assumptions are made about the form of the band bending in the semiconductor. The problem is reduced to three successive integrals over an assumed N(epsilon) by change of variable from distance to applied voltage and the best fit to the experimental data is obtained by iteration of the assumed state density. The method is shown to be no less rigorous and considerably more economical than the recent analysis of Goodman, Fritzsche and Ozaki. In addition, an experimental means of determining the flat-band voltage to within 5% of the maximum gate voltage V/sub g/ used is demonstrated, by finding the value of V/sub g/ for which (kT/e)dlog I/sub SD//dV/sub g/ is independent of temperature. (ERA citation 06:021764)

DOE/ET/23037-4 PC **A05**/MF **A01**
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Determination of Pseudogap State Density and Carrier Mobility in RF Sputtered Amorphous Silicon. Final Technical Report, July 1, 1979-June 30, 1980.
W. Paul. Sep 80, 83p
Contract AC03-79ET23037

The first objective is to determine whether field effect could be observed in samples of sputtered hydrogenated amorphous silicon, and, if it could, to compare the pseudogap density of states determined therefrom with estimates made by other methods of investigation. The second is to determine the drift mobility of excess carriers in these materials by time-of-flight, and to interpret its magnitude and temperature dependence in terms of current theories of transport in disordered semiconductors. The field effect has been observed, but the conditions required are such as to imply that deductions of the state density from it may not accurately represent the bulk density of states. In the course of this work a simpler method of reducing field effect data has been developed. The drift mobility has also been measured, but these experiments have not yet assembled sufficient statistics for final conclusions to be drawn from them. (ERA citation 06:022311)

PAT-APPL-6-257 028 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Selective Photoinduced Condensation Technique for Producing Semiconducting Compounds.
Patent Application,
Abe Auerbach. Filed 24 Apr 81, 14p AD-D008 550/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A process is given for producing a variety of organic-inorganic luminescent and semiconductive compounds or materials in the form of a film deposited directly on the surface of a substrate by ultraviolet photoinduced condensation from gaseous reactants such as antimony pentafluoride (SbF5)n and organic or inorganic halogen-containing compounds. The process provides a new class of antimony (Sb) doped luminescent and semiconductive materials which can be produced on any arbitrary size or shape substrate, or even on existing substrates of other semiconductive materials or chips, to form semiconductive devices. The process may be used in photoinducing luminescent panel displays or microelectronic circuits, such as integrated electrical or optical circuits. (Author)

SERI/PR-8031-1-T4 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Photoelectronic Properties of Zinc Phosphide Crystals, Films and Heterojunctions. Quarterly Progress Report No. 8, January 1-March 31, 1981.
R. H. Bube. 1981, 31p
Contract AC02-77CH00178

Temperature dependence of electrical conductivity was analyzed for three sublimation-grown crystals, three iodine transport crystals, and three polycrystalline samples, using measured Hall effect mobility data on some samples and a multi-impurity computer model. In sublimination-grown single crystal and polycrystalline samples three levels dominate: less than or equal to 0.02 eV, 0.25 eV, and 0.47 eV. Relatively good fits can be obtained to measured data with simple computer models involving two or three acceptors and one donor. A literature search has been done on the optical properties of Zn sub 3 P sub 2 , resulting in a composite absorption vs photon energy curve. Evidence for split valence bands is obtained from ac photoconductivity measurements, and initial exploratory measurements have been made on laser-excited photoluminescence at 2 to 15 exp 0 K. A detailed investigation was made of the commonly found non-stoichiometry of the Zn sub 3 P sub 2 films deposited by CSVT (usually about 25% excess Zn), and considerable evidence amassed to indicate that the excess Zn is localized near the surface of the film and in voids in the film. (ERA citation 06:023285)

20M. Thermodynamics

AD-A100 815/0 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Investigation of the Numerical Methods of Finite Differences and Weighted Residuals for Solution of the Heat Equation.
Master's thesis,
Robert Earl Naegeli. Mar 82, 99p Rept no. AFIT/GNE/PH/81-7

The method of weighted residuals applied on the whole domain for steady state and transient heat generation problems was compared to finite difference methods. The comparison consisted of the maximum absolute error from the exact solution and computer time required for solution. One steady state and one transient heat generation problem were solved by collocation and Galerkin weighted residual methods and finite differences. The least squares weighted residual method was also used for the steady state problem. Both problems were one-dimensional and had Dirichlet boundary conditions. Integrals for weighted residual methods were evaluated analytically to produce recursion relations. The transient problem was solved by the reduction to ordinary differential equations method for weighted residuals. The Galerkin method was fastest to a given accuracy for both problems evaluated. The accuracy of Galerkin and other weighted residual methods was greater than finite differences after a point at low solution accuracy. This crossover point was typically two to three digits of accuracy. The polynomial trial functions used for weighted residual solutions exhibited a numerical instability for solutions of 10 terms and over increasing the maximum absolute error. Orthogonal collocation and weighted residuals on finite elements were recommended as alternate methods. (Auhtor)

AD-A101 064/4 PC **A11**/MF **A01**
Stanford Univ., CA. Dept. of Physics.
I. Spin-Lattice Relaxation of Dilute Solutions of Polarized He3 in Liquid He4 in Low Magnetic Fields at 4 K. II. An Analysis of a Proposed Cryogenic He3 Nuclear Gyroscope and Its Application to a Nuclear Electric-Dipole Moment Experiment.
Doctoral thesis,
Michael A. Taber. Aug 78, 237p AFOSR-TR-81-0522
Contracts F44620-75-C-0022, F49620-78-C-0088

Measurements were made of the spin-lattice nuclear relaxation time of 0.07% solutions of polarized helium-3 in liquid helium-4 at 4 K by use of an rf-biased SQUID (Superconducting Quantum Interference Device) magnetometer in magnetic fields ranging between 30 microGauss and 3 milliGauss. After the effect of magnetic-gradient-induced relaxation was subtracted by extrapolation to large magnetic fields, it was found that the relaxation time was 40 hours in a 1 cm-diameter pyrex cell. When the sample cell was prefilled with an amount of hydrogen estimated to be equivalent to uniform wall coating of 30 molecular layers thickness, the extrapolated relaxation time increased to 5 days. It is estimated that this result was dominated by intrinsic relaxation due to helium-3 dipole-dipole interactions in the bulk of the sample. As a potential application, the performance of a proposed cryogenic nuclear gyroscope utilizing a helium-4 -- polarized helium-3 gas mixture with SQUID magnetometer readout in zero magnetic field is theoretically analyzed. The possibility of using a modified version of this device based on a polarized helium-3 -- superfluid helium-4 mixture for the purpose of an experimental search for an electric-dipole moment in the helium-3 nucleus is also discussed. (Author)

20N. Wave Propagation

AD-A100 680/8 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Effect of Geomagnetic Activity on Equatorial Radio VHF Scintillations and Spread F,
R. G. Rastogi, J. P. Mullen, and E. MacKenzie.
11 Sep 80, 6p Rept no. AFGL-TR-81-0169
Pub. in Jnl. of Geophysical Research, v86 nA5 p3661-3664, 1 May 81.

No abstract available.

AD-A100 701/2 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Airborne Man-Made Radio Noise Assessment.
Final rept. Mar-Dec 80,
T. N. Roy. 15 Apr 81, 26p Rept no. NOSC/TR-677

An airborne man-made radio noise model has been developed and programmed on a graphics computer at the Naval Ocean Systems Center. This model provides a useful approximation to the geographical dependence of airborne man-made radio noise in the continental United States. Radio noise maps produced from this model are used to evaluate the effect of man-made radio noise on the operation of meteor burst communication systems. Equations developed by Skomal (E. N. Skomal, Man-Made Radio Noise, Van Nostrand Reinhold Co., New York, 1978) are used to construct the model. Two parametric equations are used to model the height gain of man-made radio noise as a function of distance, 0 to 150 miles, from the source. Coefficients for these equations are calculated from data measured over Seattle (W. E. Buehler and C. D. Lunden, IEEE Trans. Electromagnetic Compatibility, EMC-8, 143-152, 1966). Two hundred of the nation's largest cities and 62 of the largest counties and military installations are used as sources of radio noise in the computer program. Day and nighttime contours can be produced in the 25 to 75 MHz range for altitudes between 30 and 70 thousand feet. (Author)

AD-A100 755/8 PC **A09**/MF **A01**
Columbia Radiation Lab. New York.
Research Investigation Directed Toward Extending the Useful Range of the Electromagnetic Spectrum.
Progress rept. no. 31, 1 Apr 80-31 Mar 81,
George W. Flynn. 31 Mar 81, 194p
Contract DAAG29-79-C-0079, Grant AFOSR-77-3407
Sponsored in part by Contracts N00014-78-C-0517, DAAG29-80-C-0043, and DE-AS02-ER-78-S-02-4940.

Contents: Quantum Detection and Sensing of Radiation; Physical Properties and Effects in Electronic Materials; Energy Transfer and Relaxation in Small Polyatomic Molecules; Energy Transfer and Relaxation in Alkali Metals; Picosecond Energy Transfer and Photofragmentation Spectroscopy; Generation and Control of Radiation.

AD-A100 868/9 PC **A03**/MF **A01**
R and D Associates, Marina del Rey, CA.
Extended Theory for Approximate ELF Propagation Constants in the Earth-Ionosphere Waveguide.
Topical rept. 27 Nov 78-1 Sep 79,
Carl Greifinger, and Phyllis Greifinger. 1 Sep 79, 34p RDA-TR-110005-001, DNA-5561T
Contract DNA001-79-C-0011

Simple analytic approximate expressions have been derived for ELF propagation constants in the earth-ionosphere waveguide. The expressions are

an extension of previous work to a more general class of ionospheric-conductivity height profiles. The expressions derived here allow the rapid computation of ELF phase speeds, attenuation rates, and excitation factors for a wide range of ionosphere conditions without the necessity of lengthy full-wave computer calculations. The results can be applied to the rapid evaluation of the effects of a variety of ionospheric disturbances, both natural and artificial, on ELF communication systems. (Author)

AD-A101 085/9 PC **A02**/MF **A01**
Delaware Univ., Newark.
The Inverse Electromagnetic Scattering Problem for a Perfectly Conducting Cylinder,
David Colton. 15 Mar 80, 6p AFOSR-TR-81-0540 Grants AFOSR-76-2875, NSF-MCS78-02542
Pub. in IEEE Transactions on Antennas and Propagation, vAP-29 n2 p364-368 Mar 81.

No abstract available.

AD-A101 151/9 PC **A06**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
Controlled Wave-Particle Interaction and VLF Wave Propagation Experiments in the Outer Magnetosphere.
Interim rept. 1 Jan 78-30 Sep 80,
H . C. Koons. 15 Jun 81, 121p TR-0081(6960-06)-5, SD-TR-81-54
Contract f04701-80-C-0081, Grant NSF-ATM77-19361

VLF transmission experiments were conducted from sites in North Norway during selected time periods in 1978, 1979 and 1980. Data from these experiments were collected from VLF receivers aboard the SCATHA (P78-2) and GEOS satellites and VLF receivers on the ground at various locations in Norway and Sweden. Direct signals were measured at each of the ground stations and emissions triggered by the transmissions were detected by the satellite receivers. This report documents the impedance measurements made on each of three power lines used as VLF antennas and summarizes the preliminary results from the VLF receiver data. (Author)

PB81-868143 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Pulse (EMP): Phenomena, Simulation, and Hardening. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 92p

This bibliography covers various aspects of electromagnetic pulses (EMP) from the environment, through systems design and testing. The interactions and coupling of electronic components and systems, communication and power transmission systems, and sea, air, and spacecraft with EMP are considered as is their protection from it by shielding, isolation, and hardening methods and devices. Some attention is given to physical and computerized simulations of EMP, and to health and safety hazards associated with its generation. (Contains 92 citations fully indexed and including a title list.)

PB81-868168 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Pulse (EMP): Phenomena, Simulation, and Hardening. January, 1972-July, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Jul 81.
Jul 81, 66p

This bibliography contains citations concerning electromagnetic pulse (EMP) generation and propagation mechanisms and interactions and coupling with various structures, aircraft, spacecraft, and missiles, as well as electronic components, electrical circuits, and antennas. Physical and computerized simulations of EMP and EMP environments and interactions are considered. EMP protection methods and devices, including hardening, shielding, and isolation, are also covered. (Contains 56 citations fully indexed and including a title list.)

21.

PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A100 693/1 PC **A04**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Gas Diagnostic Measurements by Coherent Anti-Stokes Raman Spectroscopy: Feasibility Calculations for Water Vapor in Combustion Systems.
Final rept. 15 Jul 77-15 Oct 79,
R. L. St. Peters, and M. Lapp. Jun 80, 68p SRD-81-023, AFWAL-TR-80-2062
Contract F33615-77-C-3112

Coherent anti-Stokes spectroscopy (CARS) can be considerably simpler than is suggested by literature analyses based on interactions of monochromatic waves. The simplification arises when the optical properties of real lasers are incorporated into the analysis. To incorporate these properties, it is necessary to recognize that the underlying nonlinear optical interaction has a previously ignored complexity and is dependent on the coherence properties of the fields as well as on their spectra. The coherence of the interaction, as described by the CARS linewidth parameter, is degraded by the imperfect coherence of the laser sources. The occurrence of the nonlinear interaction depends on the small size of laser mode widths, or more fundamentally, on the statistical degeneration of each incident field into a small number of independent fields, a property possessed only by optical fields from lasers. If the lasers' contributions to the linewidth parameter are made dominant, the degree of coherence becomes a fixed property of the apparatus, simplifying interpretation of CARS spectra and extending the range of usefulness of CARS well beyond what would otherwise be expected. Available numerical values plus considerations of effects such as mode frequency chirp suggest that domination of the coherence by the apparatus can be arranged or at least approached in most cases.

CONF-8010187- PC **A99**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Fluidized-Bed Combustion System Design and Operation.
C. H. Putman. 1980, 698p
Contract AM21-78MC08333
DOE/WVU conference on fluidized bed combustion system design and operation, Morgantown, WV, USA, 27 Oct 1980.

Eighteen papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 06:024041)

DOE/ET/10593-T1 PC **A02**/MF **A01**
Western Michigan Univ., Kalamazoo. Dept. of Chemistry.
Fundamentals of Nitric Oxide Formation in Fossil Fuel Combustion. Progress Report, 29 June-28 September 1980.
T. Houser, and M. E. McCarville. Dec 80, 21p FE-2018-18
Contract AC21-76ET10593

The study of the oxidation kinetics of pyridine was completed in the temperature range of 948 to 1073 exp 0 K and concentration ranges of 1.75 to 7.0 mole % oxygen; 0.25 to 2.0 mole % pyridine. The rate law is rate = k(C sub 5 H sub 5 N)/sup 1/2/(0 sub 2)(delta 0 sub 2)/sup 1/2/, where delta 0 sub 2 is oxygen consumed (autocatalysis). The temperature dependence is k = 10/sup 14.7 +- .7/ exp(-26600 +- 1600/T)(1/mole s). The yield of HCN appeared insensitive to changes in temperature, concentrations and equivalence ratio, and only trace amounts of nitrogen oxides and ammonia were found. Fuel-rich mixtures produced large amounts of smoke so that a nitrogen balance was not possible but for lean mixtures HCN and N sub 2 accounted for the product nitrogen. Increase to 2% pyridine and 14% oxygen produced reduced yields of HCN and increased yields of N sub 2 , N sub 2 O, and NO. H sub 2 had no influence on the rates of pyrolysis and oxidation of pyridine. At 1073 exp 0 K HCN was oxidized at a measurable rate, added benzene increased the rate of oxidation at low equivalence ratios and reduced it at ratios above 0.9, with no significant nitrogen oxides produced, added acetylene increased the oxidation rate and also produced NO. It is clear that conditions can be found for the oxidation of heterocyclic nitrogen compounds that promote the formation of N sub 2 at the expense of NO. (ERA citation 06:022414)

DOE/ET/10744-T3 PC **A02**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Evolution of Fuel Nitrogen During the Vacuum Thermal Devolatilization of Coal.
J. D. Freihaut, and D. J. Seery. 1981, 18p
Contract AC21-78ET10744

The fate of fuel nitrogen during the combustion or gasification of coal is a matter of practical and fundamental concern. During coal combustion, NO/sub x/ is known to form via HCN species released from the nitrogen-containing molecular components of the coal. During gasification processes, the release of nitrogen-containing fused ring compounds in evolved tar species is a matter of environmental concern. Since the thermal decomposition of the parent coal is an initial phase in both combustion and gasification, it is necessary to develop a knowledge of the fate of fuel nitrogen during thermal decomposition. This study contains results of an investigation of the evolution of fuel nitrogen during the vacuum thermal decomposition of coal. Results are shown for variations with coal characteristics and apparent thermal history. Apparent heating rates of 75 C/sec to 2000 C/sec and final temperatures of 500 C to 1780 C were utilized. A variety of coals were investigated ranging in rank from lignite to anthracite. The results indicate that nitrogen distribution in the volatiles is a sensitive function of the chemical characteristics of the parent coal. This distribution of nitrogen in the light gas, tar and char products of vacuum devolatilized coal is highly dependent on rank of the parent coal. Variations in nitrogen evolution with coal characteristics are most readily apparent in several aspects: (1) the coal nitrogen released with the tar species; (2) the release of nitrogen contained in primary tars as HCN upon secondary thermal decomposition reactions of the primary tars; (3) the retention of nitrogen in the char species. (ERA citation 06:023015)

DOE/ET/11287-T1 PC **A10**/MF **A01**
Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
Fundamental and Semi-Global Kinetic Mechanisms for Hydrocarbon Combustion. Final Report, March 1977-October 1980.
F. L. Dryer, I. Glassman, and K. Brezinsky. Mar 81, 208p
Contract AC22-77ET11287

Over the past three and one half years, substantial research efforts of the Princeton Fuels Research Group have been directed towards the development of simplified mechanisms which would accurately describe the oxidation of hydrocarbons fuels. The objectives of this combustion research included the study of semi-empirical modeling (that is an overall description) of the chemical kinetic mechanisms of simple hydrocarbon fuels. Such fuels include the alkanes: ethane, propane, butane, hexane and octane as well as the critically important alkenes: ethene, propene and butene. As an extension to this work, the study of the detailed radical species characteristics of combustion systems was initiated as another major aspect of the program, with emphasis on the role of the

OH and HO sub 2 radicals. Finally, the studies of important alternative fuel problems linked the program to longer range approaches to the energy supply question. Studies of alternative fuels composed the major elements of this area of the program. The efforts on methanol research were completed, and while the aromatics aspects of the DOE work have been a direct extension of efforts supported by the Air Force Office of Scientific Research, they represented a significant part of the overall research effort. The emphasis in the proposed program is to provide further fundamental understanding of the oxidation of hydrocarbon fuels which will be useful in guiding engineering approaches. Although the scope of program ranges from the fundamentals of chemical kinetics to that of alternative fuel combustion, the objective in mind is to provide insight and guidance to the understanding of practical combustion environments. The key to our approach has been our understanding of the fundamental combustion chemistry and its relation to the important practical combustion problems which exist in implementing energy efficient, alternate fuels technologies. (ERA citation 06:023248)

DOE/PC/30294-2 PC **A02**/MF **A01**
Physical Sciences, Inc., Woburn, MA.
Pulverized-Fuel Combustion: Modeling and Scaleup Methodologies. Second Quarterly Report, January 1, 1981-March 31, 1981.
P. F. Lewis, T. L. Wolf, A. Gelb, and E. Pugh.
May 81, 22p PSI-TR-262
Contract AC22-80PC30294

Most of the effort was devoted to the model element improvement in four areas: Chemical reactions of OH and O radicals with carbon surfaces; effect of particle size distribution on optical absorption properties of the coal feed; dynamics of a distribution of particle sizes; and development of scaling laws for the location and shape of recirculation zone boundaries. The conclusions from these efforts are: 1) the chemical reactions of OH and O radicals with carbon surfaces are very rapid at combustion temperature. The reactions are first order in total pressure and yield CO as the primary product. Optical absorption coefficients of Rosin-Rammler distributions of typical pulverized fuel are about three times the value for mass mean particle size. The model will include the optical absorption coefficient appropriate for the size distribution within the combustor. The particle size distribution has a significant effect on the particle velocity distribution and thus on residence times of the larger particles. Calculations of particle dynamics are underway. An exhaust search was conducted for literature related to flow patterns in axisymmetric, confined, combusting flows, both with and without swirl. Correlation of various experimental results was attempted. (ERA citation 06:023078)

DOE/PC/30299-T3 PC **A03**/MF **A01**
Spectron Development Labs., Inc., Costa Mesa, CA.
Experimental Investigation of Synfuel Spray Characteristics and Combustion Dynamics. Quarterly Technical Progress Report, January 1-March 31, 1981.
Apr 81, 40p
Contract AC22-80PC30299

Objective is to study both petroleum-based oils and synthetic fuels in spray combustion, by using advanced optical diagnostic techniques to study the processes of fuel injection and atomization, droplet ignition, and spray flame combustion. During this period, efforts were focused on the completion of the cold spray test facility, the design of the monodisperse droplet combustor, and the construction of an oil burner with the gathering of preliminary holography data. (ERA citation 06:023141)

EPRI-FP-1199(V.2) PC **A11**/MF **A01**
Brigham Young Univ., Provo, UT. Dept. of Chemical Engineering.
Mixing and Kinetic Processes in Pulverized Coal Combustors. Volume 2: User's Manual for a Computer Program for 1-Dimensional Coal Combustion or Gasification (1-DICOG).
P. J. Smith, and L. D. Smoot. Oct 79, 227p

A one-dimensional, steady-state model describing pulverized coal combustion and gasification is presented. While emphasis has been placed on the description of the coal reaction processes and gas-particle interactions, one-dimensional fluid mechanics and particle-particle, particle-wall radiation have been included. Moisture vaporization from the coal particles, multi-step coal pyrolysis, and heterogeneous char oxidation by multiple oxidizers are modeled for polydispersed coal particle sizes or types. Although the formulation is one-dimensional, mixing rates of primary and secondary streams and recirculation within the reactor have been accounted for as specified input. The resulting model predicts thermal, chemical and physical histories for both the gaseous and particle phases. Gas-particle interactions account for appropriate diffusion and kinetic rates. Gas phase reactions are assumed to be in local chemical equilibrium. The solution technique uses predictor-corrector methods for integration of the ordinary non-linear differential equations which are coupled with a number of auxiliary algebraic equations. An iterative approach is required for the radiant heat transfer calculations by the zone method. Stiffness in differential energy equations is overcome by a pseudo steady-state method when needed. The generalized nature of the model allows for calculation of both coal combustion and coal gasification characteristics. User information is presented, along with a sample computation and a listing of the program. (ERA citation 05:021724)

UCRL-Trans-11681 PC **A03**/MF **A01**
Theory of Gasless Combustion.
A. G. Merzhanov. 1974, 42p
Contract W-7405-ENG-48
A, Arch. Procesow Spalania, 5 n1 P17-39 1974.

Gasless combustion is the combustion reaction in the condensed phase, unaccompanied by evaporation or gaseous reaction products. Basic results are presented on the theory of gasless combustion. The following problems are treated: physicochemical and thermal-diffusion aspects of the mechanism of gasless combustion; thermodynamic analysis of gasless combustion; the simplest theory of gasless combustion; peculiarities of gasless combustion in heterogeneous systems; and experimental confirmation of the theory of gasless combustion. The paper points out problems in whose solution the methods of the theory of gasless combustion are fruitful. (ERA citation 06:023999)

21C. Electric Propulsion

N81-26177/8 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
Inert Gas Thrusters.
Annual Report.
H. R. Kaufman, and R. S. Robinson. Dec 80, 94p
NASA-CR-165332
Grant NSG-3011

Some advances in component technology for inert gas thrusters are described. The maximum electron emission of a hollow cathode with Ar was increased 60-70% by the use of an enclosed keeper configuration. Operation with Ar, but without emissive oxide, was also obtained. A 30 cm thruster operated with Ar at moderate discharge voltages give double-ion measurements consistent with a double ion correlation developed previously using 15 cm thruster data. An attempt was made to reduce discharge losses by biasing anodes positive of the discharge plasma. The reason this attempt was unsuccessful is not yet clear. The performance of a single-grid ion-optics configuration was evaluated. The ion impingement on the single grid accelerator was found to approach the value expected from the projected blockage when the sheath thickness next to the accelerator was 2-3 times the aperture diameter.

21D. Fuels

AD-A100 692/3 PC **A03**/MF **A01**
General Technology Applications, Inc., Arlington, VA.
Application of General Technology Applications, Incorporated (GTA) Blending Process to Antimisting Fuel Additives.
Final rept. Aug 80-May 81,
J. C. Trippe, Paul F. Waters, and Albert F. Hadermann. May 81, 28p FAA-CT-81-51
Contract DTFA-03-80-C-00070

This program examines the applicability of a proprietary blending process to blending antimisting additives in JET A aviation fuel. The first phase of the program covers use of the process with a high molecular weight polyisobutylene. The second phase covers the use of the process with Imperial Chemical Industries, Ltd's proprietary polymer, FM-9. The results of the program indicate that high molecular weight polyisobutylene can be blended rapidly with JET A using the proprietary process and that the resulting blend demonstrates antimisting behavior within minutes. There was no evidence that the proprietary process is effective in the blending of FM-9 in JET A. (Author)

AD-A100 831/7 PC **A02**/MF **A01**
Army Facilities Engineering Support Agency, Fort Belvoir, VA. Technology Support Div.
Methods for Determining Nonmerchantable Forest Biomass Yields for Use as Fuel.
Final rept.,
Stephen C. Forget. 19 Jul 80, 12p Rept no. USAFESA-TS-2089

This report is intended to provide the reader with a brief overview of state-of-the-art methods for determining nonmerchantable forest biomass yields, with emphasis on the Southeastern United States. Detailed information/methodologies for specific needs may be found in the references. (Author)

AD-A101 069/3 PC **A05**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Military Fuels Refined from Paraho-II Shale Oil.
Interim rept. Jun 79-Nov 80,
J. N. Bowden, E. C. Owens, D. W. Naegeli, and L. L. Stavinoha. Mar 81, 96p Rept no. AFLRL-131
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001

Shale-derived JP-5, JP-8, aviation turbine fuels and marine diesel fuel were analyzed for compliance with military specifications and evaluated for storage stability, corrosion tendencies, additive response, compatibility with petroleum fuels and microbiological growth susceptibility. The shale fuels behaved very much like petroleum-derived fuels. Turbine combustor evaluation showed a likeness to petroleum-derived Jet A fuel. Performance tests of the shale fuels conducted in four diesel engines also indicated a similarity with the same tests performed with petroleum-derived fuels. (Author)

DE81024060 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Hydrogen Production by Fluid-Bed Retorting of Oil Shale.
J. W. Barnes. May 81, 24p LA-8832-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

The oil produced from retorting of oil shales requires hydrogen treatment to improve its characteristics and make it suitable for refining into marketable products. Hydrogen requirements can be met by partial oxidation of a fraction of the shale oil produced or by direct processing of oil shale in a fluid bed. This report examines the economics and engineering feasibility of using fluid bed systems to produce hydrogen. Fluid bed processing of oil shale to produce hydrogen might be technically and economically competitive with a more conventional shale retorting/partial oxidation method. A major development program would be required to demonstrate the feasibility of the fluid bed approach. (ERA citation 06:023241)

DE81024404 PC **A09**/MF **A01**
Kaiser Engineers, Inc., Oakland, CA.
Industrial Utilization of Waste Derived Energy.
Jun 81, 190p DOE/CE/20030-1
Contract AC03-78CS20030
Microfiche only after original copies are exhausted.

A technical and economic feasibility study of a partial oxidation unit (Union Carbide Corporation's PUROX system) was conducted. Major objectives of the program were: (1) disposal of both urban (municipal refuse and sewage sludge) and agricultural (dairy) wastes, and (2) the production of a medium-Btu fuel gas. The investigated wasteshed includes those portions of Western San Bernardino County, Eastern Los Angeles County, and Northwestern Riverside County. Section 2 is a summary chapter. The available waste supply (municipal refuse, sewage sludge, dairy wastes) is discussed in Section 3. Transportation of these waste materials is discussed in Section 4. Product quantities and energy products of fuel gas, steam, and electricity are discussed in Section 5, Markets for Energy and Recovered Materials. Ferrous metals, aluminum, and nonferrous metals, and slag are the materials studied. (ERA citation 06:023774)

DOE/BC/10300-10 PC **A02**/MF **A01**
Oklahoma Univ., Norman.
Use of Microorganisms in Enhanced Oil Recovery.
J. B. Clark, D. Munnecke, R. Knapp, and D. Menzie. 27 May 81, 6p
Contract AS19-80BC10300

Progress is reported in the following areas: sterilization of cores was achieved by using a ClO sub 2 solution (OXINE) at a concentration of 2000 ppM for 18 hours inside the core, and sterilization of flow tubing and valves was done by autoclaving at 121 exp 0 C for 20 minutes; the problem of high death rate of the indicator organism (Serratia rubidae) in brine solution was resolved by the addition of small amounts (10 to 20 ppM) of Bactopeptone (an enzymatic protein digest) to the brine solution which made it possible for an initial viable population of 10 exp 5 cells/ml to survive for at least 72 hours; and the best biosurfactant producing organism was identified as Bacillus lichenformis. (ERA citation 06:021569)

DOE/CE/20167-05 PC **A06**/MF **A01**
National Center for Resource Recovery, Inc., Washington, DC.
Waste-to-Energy Compendium. Final Report.
Apr 81, 125p
Contract AC01-76CS20167

A survey is made of 35 waste-to-energy recovery projects throughout the US. Included are nine refuse-derived fuel (RDF) production facilities, six RDF user facilities, two combined RDF production-user facilities, and 18 mass burning facilities with energy recovery. Only those facilities that are fully operational or those in advanced stages of startup and shakedown are surveyed. Information is provided on processing capacities, operation and maintenance problems, equipment specifications, capital and operating costs, and the current status of each facility. In addition, process flow schematics are provided for each of the nine RDF production plants and both RDF production-user plants. Unless otherwise indicated, the data in this report have been updated to October or November, 1980. (ERA citation 06:022238)

DOE/CS/40352-T2 PC **A04**/MF **A01**
Centec Corp., Reston, VA.
Energy Conservation in Ethanol Production from Renewable Resources and Non-Petroleum Energy Sources.
Mar 81, 63p
Contract AC01-80CS40352

The dry milling process for the conversion of grain to fuel ethanol is reviewed for the application of energy conservation technology, which will reduce the energy consumption to 70,000 Btu per gallon, a reduction of 42% from a distilled spirits process. Specific energy conservation technology applications are outlined and guidelines for the owner/engineer for fuel ethanol plants to consider in the selection on the basis of energy conservation economics of processing steps and equipment are provided. The process was divided into 5 sections and the energy consumed in each step was determined based on 3 sets of conditions; a conventional distilled spirits process; a modern process incorporating commercially proven energy conservation; and a second generation process incorporating advanced conservation technologies which have not yet been proven. Steps discussed are mash preparation and cooking, fermentation, distillation, and distillers dried grains processing. The economics of cogeneration of electricity on fuel ethanol plants is also studied. (ERA citation 06:021732)

DOE/EIA/06278-T1 PC **A02**/MF **A01**
Maine State Government, Augusta.
Distillate Price-Monitoring System. Final Report.
G. Tibbetts. 1977, 9p
Contract FC01-78EI06278

In June 1977 the Main Office of Energy Resources, (OER), developed the Price Monitoring Survey, (PMS), to collect data to be analyzed and used as an indication of the average price of home heating fuels (Kerosene, No. 2) in the State and with less statistical validity at the county level. From a total population of approximately 500 fuel oil dealers a sample of 32 dealers was selected. The sample was selected from each of Maine's sixteen counties based on population centers with at least one sample point from each county. After sample selection was completed each of the 32 selected fuel oil dealers was telephoned and asked for the retail price of kerosene (number one), and the retail price of number two home heating fuel. In order to facilitate processing of survey results a computer program was developed. The program is interactive and is written in VSAPL. Each time the telephone survey is conducted input is verified and analysis is performed on the IBM-370 model 148 computer at the University of Maine at Orono. The OER believes that the program was a successful attempt to monitor price fluctuations in the home heating oil, retail market and intends to continue the program. It is felt that the program should be expanded to motor gasoline. Tables and graphs relating to the data collected are provided. These attachments depict price fluctuation over time and display the outputs of the program. (ERA citation 06:021583)

DOE/EIA/06278-T2 PC **A03**/MF **A01**
Maine Office of Energy Resources, Augusta.
Heating Oil Supply/Price Monitoring Report: Part I. Historic Data, August 1978-July 1979. Part II. Current Data, August 1979-May 1980.
Aug 80, 26p
Contract FC01-78EI06278

The 1973-1974 oil embargo brought national realization to the importance, and need for the collection and analysis of energy data. The Maine Office of Energy Resources (OER) is responsible for the establishment and implementation of energy plans and policies in the State of Maine. The Supply/Price Monitoring System has been created to assist energy planners both in Maine and the nation. This survey is used to analyze trends in home heating oil supply and price, and as a tool in responding to inquiries from: citizens, other state agencies, federal and local offices, and the Office of the Governor. This report will describe the Supply/Price Monitoring System, and the results obtained from the survey, during the period August 1, 1979 through May 31, 1980. Historical data is also provided as required by the aforementioned agreement between the OER and the US Department of Energy. (ERA citation 06:021584)

DOE/EIA/10169-T1 PC **A02**/MF **A01**
New Jersey Dept. of Energy, Newark.
Program to Monitor the Weekly Retail Price of Home-Heating Fuel Oil No. 2 in the State of New Jersey. Year One Final Report.
Jun 79, 7p
Contract FC01-79EI10169

In order to enable the Energy Information Administration (EIA) of the United States Department of Energy (US DOE) to execute its role in monitoring the cost and price movements within the United States' petroleum industry and to perform analyses and projections related to energy supplies, demand, and prices, the US DOE and the New Jersey Department of Energy (NJ DOE) entered into a cooperative agreement effective between February 26, 1979 and May 30, 1979. The NJ DOE agreed to undertake a weekly program to monitor and evaluate price fluctuations of residential heating oil (No. 2) sold in the State of New Jersey. The sample was randomly selected from a list of home heating oil dealers for each county. Each of the heating oil dealers was advised by letter of the overall purpose of the survey and of the specific information which would be requested. The survey was conducted by telephone on each Monday for the period February 26, 1979 through May 30, 1979. The dealers were asked for the discounted price of home heating oil (No. 2) as of the close of business of the preceding Saturday. The discounted price was defined as the gross price less any discount for early cash payment (i.e., 2% discount for payment within 10 days). Overall state maximum, minimum, and mean prices were calculated as well as the mean for each county in New Jersey. These data were reported to the Region II EIA Data Coordinator by letter within one or two days of their compilation. The statewide maximum, minimum, and mean prices were also reported by telephone to the Washington office of the EIA. A table is presented in this report with these data. (ERA citation 06:021585)

DOE/EIA/10221-T2 PC **A03**/MF **A01**
Connecticut State Government, Hartford.
State of Connecticut Middle Data Collection Program. Final Report, August 1, 1979-May 31, 1980.
J. Salamandra, and R. Wilson. 1980, 33p
Contract FC01-79EI10221

The Connecticut Office of Policy and Management, Energy Division, conducted a heating oil monitoring program of Connecticut fuel oil suppliers and dealers. From August 1979, through May 1980, the Energy Division conducted a biweekly price and inventory survey for No. 2 fuel oil and kerosene. The purpose of the survey has been to provide data necessary for the US Department of Energy's Energy Information Administration to execute its role in monitoring cost and price movements within the US petroleum industry and in performing analyses and projections related to energy supplies, demands, and prices for No. 2 fuel oil. The survey has also provided the state of Connecticut with a current, consistent, and reliable set of figures on heating oil prices and inventories and provided a mechanism for handling consumer inquiries concerning price and supply conditions. (ERA citation 06:021586)

DOE/EIA/10297-T1 PC **A02**/MF **A01**
Rhode Island State Governor's Energy Office, Providence.
State of Rhode Island No. 2 Heating Oil Data Collection Program. Final Report, August 27, 1979-May 22, 1980.
Jul 80, 20p
Contract FC01-79EI10297

A one-time survey of the approximately 250 No. 2 fuel oil retail dealers in the state of Rhode Island was conducted by the Governor's Energy Office during July and August of 1979. The information that was sought included name of supplier(s), storage capacity, number of customers, historic deliveries and historic inventories. The total number of dealers who responded to each question ranged between 39 and 190. While the participation was somewhat limited, the survey nevertheless provided the Energy Office with its first profile of the state's retail No. 2 heating oil dealers. While the collection of historic data may be of interest, the collection of accurate and up-to-date data on the price and supply of No. 2 oil is absolutely vital to ensure that adequate supplies are available to the approximately 200,000 dependent Rhode Island households. Tables are provided giving the high, low and average prices of retail and wholesale prices of No. 2 heating oils and retailer margins, inventories, and deliveries. (ERA citation 06:021587)

DOE/ER/10190-T1 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Solar Photo-Catalytic Hydrogen: Systems Considerations, Economics, and Potential Markets. Final Report.
R. V. Steele, and J. G. Witwer. May 81, 87p

Contract AC03-80ER10190

A three part analysis was done consisting of (1) an examination of the physical principles of solar photocatalytic energy conversion and the status of research in this area, (2) an economic analysis of the potential costs of producing hydrogen from such a system, and (3) an analysis of the markets for hydrogen and the possible penetration of these markets by solar photocatalytic hydrogen. The cost range of flat plate thermal collectors, heliostats, and a photovoltaic system are compared. The cost range of flat plate thermal collectors was used to represent the cost of photocatalytic systems. On the basis of the photovoltaics cost outlook, it is found that photocatalytic systems would not cost less than $180 to $330 per m exp 2 range. On the basis of the heliostat cost outlook, a cost lower than $180 to $330 per m could be projected only for very large production volumes and very large installations. (ERA citation 06:023240)

DOE/ET/10104-1 PC **A03**/MF **A01**
Gulf Science and Technology Co., Pittsburgh, PA. Chemical and Minerals Div.
Solvent-Refined Coal (SRC) Process. Vapor-Liquid Equilibrium Measurements for the SRC-II Process.
R. M. Henry. Oct 80, 46p
Contract AC05-76ET10104

This report summarizes vapor-liquid equilibrium studies conducted to support the Solvent Refined Coal project by the Pittsburg and Midway Coal Mining Company under contract with the Department of Energy. Discussed herein are experimental details and results of measurements to obtain vapor-liquid equilibrium data at conditions simulating those which occur during the gas-liquid separation steps in the SRC-II coal liquefaction process. Separation and compositional analyses of liquid and gas phases permitted calculation of the equilibrium K values for the various components of the mixture. Experimental methods and apparatus used in this work were compared to a system recently described in the literature. The measured K values agreed to within an average of +- 5% of published values and showed that the experimental system developed is satisfactory. Internal consistency of each experiment was evaluated by a material balance consistency test, and an average material balance of 99.7% was obtained over the 15 experiments. Data obtained from this work will serve as the basis for K value correlations used in process design calculations for the SRC-II Demonstration Plant. (ERA citation 06:023002)

DOE/ET/10679-T9 PC **A02**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
ESCOE Engineering Program. Combined Monthly/Quarterly Report, March 1, 1981-May 31, 1981.
Jun 81, 14p FE-2468-96
Contract AC01-77ET10679

The objective of the ESCOE Engineering Program is to provide independent assessments of key portions of energy RD and D programs conducted by the Department of Energy. These programs are aimed at development of technology that will permit rapid commercialization of processes or converting coal into products that substitute for those derived from oil and natural gas. The imposition of an embargo on recruitment of the professional staff and development of new technical tasks severely limits ESCOE's ability to continue planned and timely performance under the contract extension. The two principal professionals currently on board are scheduled to complete their residences between June and August. Similarly qualified personnel must be recruited now to ensure the selective, orderly and continued delivery of these technical services and knowledge to the Department of Energy. (ERA citation 06:023013)

DOE/ET/13041-T1 PC **A10**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Development and Evaluation of Highly-Loaded Coal Slurries. Phase I Summary Report, October 15, 1977-December 31, 1978.
R. S. Scheffee. May 79, 202p
Contract AC22-77ET13041

Slurry fuels comprised of either bituminous, subbituminous, or lignite coal, and either aqeuous media or emulsions of No. 6 oil in water as the carrier were developed and evaluated at solids loadings up to 70% by weight. Emphasis was placed on aqueous slurries of bituminous coal. These slurries were developed for use in place of No. 6 oil in oil-fired burners. High solids loadings were attained by use of bimodal particle size distributions, which are blends of coarse-grind coal (approx. 50 to 85% -50 mesh) and fine-grind coal (generally 90% -200 mesh). The effect of the blends on slurry viscosity was determined to find the blends that minimize viscosity. The effect of mill conditions on particle size distribution was determined for each coal, using a hammermill pulverizer. A large number of water-soluble resins were evaluated for effect on slurry stability and viscosity. The best of these was found to be hydroxypropylated corn starch. Slurries based on the use of 3% solutions of the starch in water were prepared with up to 70% by weight bituminous coal and up to 65% subbituminous coal. The slurries are pourable pseudo-plastic fluids having room-temperature viscosities in the range of 550 to 1100 cp at a shear rate of 3000 sec exp -1 , depending on the type of coal, solids loading, and particle size distribution. None of the slurries exhibited hard pack settling, even after room-temperature storage up to 74 days. Oil-in-water emulsions made with polyethylene glycol (23) lauryl ether as an emulsifier were found to be stable with respect to phase separation when stored at 160 exp 0 F. Slurries made with these emulsions do not exhibit hard pack settling after one week storage at 160 exp 0 F. (ERA citation 06:023069)

DOE/ET/13041-T2 PC **A04**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Development and Evaluation of Highly-Loaded Coal Slurries.
E. T. McHale. May 80, 55p
Contract AC22-77ET13041

For the past two and one-half years Atlantic Research has been conducting a research program which involved development and combustion of slurries of coal in oil and in water. In Phase II good candidate slurries chosen from Phase I were burned in an experimental furnace and their combustion performance evaluated. Two slurry fuels were chosen for the combustion study. One consisted of a 50/40/10 (weight) coal/oil/water mixture, and the other was a 65/35 coal/water slurry stabilized with modified corn starch. The emphasis was placed on the coal/water slurry. Firings were conducted in a one MMBTUH experimental furnace constructed and instrumented for the purpose. A specially designed swirl burner/atomizer was developed for use with the coal/water slurry. Both slurries were burned successfully. Numerous firings were performed of up to one-half duration each. In the case of the coal/water slurry a small amount of gas assist was usually used, although this was eliminated in several shorter duration tests. Thermochemical calculations for coal/water slurries are presented. The presence of water in the slurry represents a relatively small energy penalty. A slurry made from a good coal will have a calorific value in the range of 10,000 Btu/lb. The heat required to vaporize the water of a 70/30 mixture is only about 300 Btu/lb slurry, or about 3 percent. Analysis of the results led to the conclusion that significant improvement in the burning maybe achievable, possibly to the point where combustion rates would be comparable to those of heavy oil. Because of the availability of coal, its cost advantage relative to oil, and especially because of the ease of handling of a liquid fuel, coal/water slurry appears to have considerable potential as a future fuel. (ERA citation 06:023070)

DOE/ET/14855-3 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Exploratory Study of Coal Conversion Chemistry. Quarterly Report, September 20, 1979-December 19, 1979.
5 Mar 80, 5p
Contract AC22-79ET14855

The objective of this task is to determine the mechanism of cleavage of key bond types in coal under nominal donor solvent coal conversion conditions. This is to be done by using selected model compounds as well as coals themselves under conditions comparable to those used in current donor solvent liquefaction processes. The specific model compounds have been chosen because i) they represent linkages and heteratom functionalities that are important in coals and ii) because their reported conversion rates are substantially greater than can be accounted for by the traditionally invoked free radical mechanism. Initially, we are focusing on a particular class of model compounds: hydroxylated diphenylmethanes. This class of compounds is important for two reasons: first, because the linkage and ring substituents are common in bituminous coals, and second, because it has been reported by Collins et al. that substitution of an -OH group on diphenylmethane makes the rate of conversion of hydroxy-diphenylmethanes to toluene and phenol (in Tetralin at 400 exp 0 C) roughly as fast as that of bibenzyl. The phenyl-CH sub 2 bond strength of hydroxyl diphenylmethane is at least 15 kcal/mole greater than the central bond in bibenzyl. Thus, if hydroxydiphenylmethane underwent conversion in tetralin by homolytic bond scission, its conversion at 400 exp 0 C would be slower by almost five orders of magnitude. In this report we discuss a possible mechanism that could account for this rapid conversion. Simple homolytic cleavage of the indicated bond in an intermediate would be fast, since it is at least 20 kcal/mole weaker than the central bond in bibenzyl. (ERA citation 06:023022)

DOE/ET/14876-T3 PC **A03**/MF **A01**
Oklahoma State Univ., Stillwater. School of Chemical Engineering.
Catalysts for Upgrading Coal-Derived Liquids. Quarterly Report, January 1-March 31, 1981.
B. L. Crynes. 15 Apr 81, 37p
Contract AC22-79ET14876

Run ZBF was conducted to determine the amount of sulfur and nitrogen removal from SRC-I/process solvent mixture in the absence of a hydrotreating catalyst. Negligible nitrogen and sulfur removal resulted from this experiment. The hydrogen content of the coal liquid increased slightly over that of the feedstock. In similar studies using other coal liquids some sulfur removal (10 to 40%) was noted under non-catalyzed conditions. Several commercial NiMo supported catalysts were analyzed for silica contents using atomic absorption. These results revealed that catalysts with large micropore size structures also contain high silica content (up to 22.5 weight percent). Several short duration runs (12 to 110 hours) were conducted in the CLTU to gather data on catalyst coking mechanisms. Using the SRC material mixed with a process solvent or creosote oil (30 weight percent SRC), solid materials were observed to form and precipitate in the latter portions of the reactor bed. The reactor system was modified to prevent the accumulation of these incompatible solids which would result in premature termination of the experimental runs. In the catalyst regeneration study (HDN-30, NiMo), a spent catalyst was regenerated and then used to hydrotreat a coal liquid consisting of 10% Synthoil II liquid mixed with raw anthracene oil. This regenerated catalyst gave equal and somewhat superior performance with respect to heteroatom removal compared to that of the fresh catalyst. A second regeneration of this same catalyst loading has been conducted and the regenerated catalyst is being prepared for a third cycle. The spent catalyst lost approximately 33% of its total surface area, yet regeneration recovered 97% of the fresh catalyst area. (ERA citation 06:023023)

DOE/ET/14881-T1 PC **A04**/MF **A01**
Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
Mechanisms and Kinetics of Coal Hydrogenation.
R. M. Baldwin, and M. W. Furlong. May 81, 64p
Contract AC22-79ET14881

Colorado School of Mines is engaged in an experimental program to develop comprehensive models for the effects of coal composition upon the kinetics and mechanisms of coal hydrogenation, for the effects of mineral matter additives (disposable catalysts) upon kinetics and mechanisms of coal hydrogenation, and for the kinetics and mechanisms of the hydrogenation of coal derived

products such as preasphaltenes, and asphaltenes. Experimental work was completed on a suite of bituminous coals, thus completing the initial phase of the coal reactivity study. Eleven of the 14 coals of the suite were successfully run in duplicate. Conversion to THF solubles was correlated well by pseudo-second order kinetics. The resulting kinetic rate constants correlated with H/C ratio, mean-max vitrinite reflectance, and a specially-defined fraction of reactive macerals. The data did not correlate well with O/C ratios of the parent coals. Computer-derived statistical fits of various kinetic models were limited in their effectiveness at fitting the experimental data. Experimental work on the first phase of the disposal catalyst studies was completed. Statistical significance testing of the experimental data showed: fractional conversion and yield of light hydrocarbon products increased with time; and mineral properties of the additives were more significant in increasing overall conversion than the additive surface areas. The relative effects of the additives are given. (ERA citation 06:023024)

DOE/EV/10237-2 PC **A09**/MF **A01**
Brigham Young Univ., Provo, UT. Dept. of Chemistry.
Identification of Sulfur Heterocycles in Coal Liquids and Shale Oils. Technical Progress Report, August 1, 1980-May 1, 1981.
M. L. Lee, and R. N. Castle. 1981, 181p
Contract AC02-79EV10237

The sulfur heterocycle separation scheme which was described in the last progress report was evaluated for quantitative recovery of individual components. The results indicate that recoveries can range from 10% to approx. 30% depending on the structure of the compound. During this period, 23 unsubstituted sulfur-containing heterocyclic ring systems were synthesized in oder to confirm GC/MS identifications and for biological testing. The four possible 3-ring heterocycles and the thirteen possible 4-ring heterocycles were tested for mutagenic activity in the histidine reversion (Ames assay) system. One of the 3-ring isomers, naphtho(1,2-b)-thiophene, and six of the 4-ring isomers induced mutations in Salmonella test strains. One of these compounds, phenanthro(3,4-b)thiophene, displayed approximately the same mutagenic activity as benzo(a)pyrene. A two-step adsorption chromatographic procedure was developed in order to fractionate synthetic fuels into various chemical-type classes for studying the relative concentrations and mutagenic activities of the various types. An SRC-II Heavy Distillate was fractionated into aliphatic hydrocarbons, polycyclic aromatic hydrocarbons, sulfur heterocycles, indoles and carbazoles, azaarenes, and amino polycyclic aromatic hydrocarbons. It was found that the amino-PAH fraction contained most of the mutagenic activity. A survey was made for compounds containing both nitrogen and sulfur heteroatoms in their structures. A number of these compounds were detected by GC using nitrogen- and sulfur-selective detection. (ERA citation 06:021501)

DOE/FC/10066-T1(V.2)
PC **A13**/MF **A01**
Energy Resources Co., Inc., Walnut Creek, CA.
Low-Rank Coal Study : National Needs for Resource Development. Volume 2. Resource Characterization.
Nov 80, 279p
Contract AC18-79FC10066

Comprehensive data are presented on the quantity, quality, and distribution of low-rank coal (subbituminous and lignite) deposits in the United States. The major lignite-bearing areas are the Fort Union Region and the Gulf Lignite Region, with the predominant strippable reserves being in the states of North Dakota, Montana, and Texas. The largest subbituminous coal deposits are in the Powder River Region of Montana and Wyoming, The San Juan Basin of New Mexico, and in Northern Alaska. For each of the low-rank coal-bearing regions, descriptions are provided of the geology; strippable reserves; active and planned mines; classification of identified resources by depth, seam thickness, sulfur content, and ash content; overburden characteristics; aquifers; and coal properties and characteristics. Low-rank coals are distinguished from bituminous coals by unique chemical and physical properties that affect their behavior in extraction, utilization, or conversion processes. The most characteristic properties of the organic fraction of low-rank coals are the high inherent moisture and oxygen contents, and the correspondingly low heating value. Mineral matter (ash) contents and compositions of all coals are highly variable; however, low-rank coals tend to have a higher proportion of the alkali components CaO, MgO, and Na sub 2 O. About 90% of the reserve base of US low-rank coal has less than one percent sulfur. Water resources in the major low-rank coal-bearing regions tend to have highly seasonal availabilities. Some areas appear to have ample water resources to support major new coal projects; in other areas such as Texas, water supplies may be constraining factor on development. (ERA citation 06:021543)

DOE/FC/10066-T1-(V.3)
PC **A99**/MF **A01**
Energy Resources Co., Inc., Walnut Creek, CA.
Low-Rank Coal Study: National Needs for Resource Development. Volume 3. Technology Evaluation.
Nov 80, 833p
Contract AC18-79FC10066

Technologies applicable to the development and use of low-rank coals are analyzed in order to identify specific needs for research, development, and demonstration (RD and D). Major sections of the report address the following technologies: extraction; transportation; preparation, handling and storage; conventional combustion and environmental control technology; gasification; liquefaction; and pyrolysis. Each of these sections contains an introduction and summary of the key issues with regard to subbituminous coal and lignite; description of all relevant technology, both existing and under development; a description of related environmental control technology; an evaluation of the effects of low-rank coal properties on the technology; and summaries of current commercial status of the technology and/or current RD and D projects relevant to low-rank coals. (ERA citation 06:021487)

DOE/FC/10066-T1(V.5)
PC **A07**/MF **A01**
Energy Resources Co., Inc., Walnut Creek, CA.
Low-Rank Coal Study. Volume 5. RD And D Program Evaluation.
Nov 80, 133p
Contract AC18-79FC10066

A national program is recommended for research, development, and demonstration (RD and D) of improved technologies for the enviromentally acceptable use of low-rank coals. RD and D project recommendations are outlined in all applicable technology areas, including extraction, transportation, preparation, handling and storage, conventional combustion and environmental control technology, fluidized bed combustion, gasification, liquefaction, and pyrolysis. Basic research topics are identified separately, as well as a series of cross-cutting research activities addressing environmental, economic, and regulatory issues. The recommended RD and D activities are classified into Priority I and Priority II categories, reflecting their relative urgency and potential impact on the advancement of low-rank coal development. Summaries of ongoing research projects on low-rank coals in the US are presented in an Appendix, and the relationships of these ongoing efforts to the recommended RD and D program are discussed. (ERA citation 06:021488)

DOE/FC/10066-T1(V.6)
PC **A03**/MF **A01**
Energy Resources Co., Inc., Walnut Creek, CA.
Low-Rank Coal Study: National Needs for Resource Development. Volume 6. Peat.
Nov 80, 36p
Contract AC18-79FC10066

The requirements and potential for development of US peat resources for energy use are reviewed. Factors analyzed include the occurrence and properties of major peat deposits; technologies for extraction, dewatering, preparation, combustion, and conversion of peat to solid, liquid, or gaseous fuels; environmental, regulatory, and market constraints; and research, development, and demonstration (RD and D) needs. Based on a review of existing research efforts, recommendations are made for a comprehensive national RD and D program to enhance the use of peat as an energy source. (ERA citation 06:021544)

DOE/IR/05106-T6 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Status Report on Energy Recovery from Municipal Solid Waste: Technologies, Lessons and Issues. Information Bulletin of the Energy Task Force of the Urban Consortium.
1980, 62p
Contract FG02-78IR05106

A review is presented of the lessons learned and issues raised regarding the recovery of energy from solid wastes. The review focuses on technologies and issues significant to currently operating energy recovery systems in the US - waterwall incineration, modular incineration, refuse derived fuels systems, landfill gas recovery systems. Chapters are: Energy Recovery and Solid Waste Disposal; Energy Recovery Systems; Lessons in Energy Recovery; Issues in Energy Recovery. Some basic conclusions are presented concerning the state of the art of energy from waste. Plants in shakedown or under construction, along with technologies in the development stages, are briefly described. Sources of additional information and a bibliography are included. (ERA citation 06:022249)

DOE/PC/30139-T1 PC **A02**/MF **A01**
Otisca Industries Ltd., Syracuse, NY.
Heavy-Liquid Beneficiation of Fine Coal. Second Quarterly Report Supplement, January 1-March 31, 1981.
D. V. Keller, Jr., and F. J. Simmons. 1981, 9p
Contract AC22-80PC30139

In our second quarterly report we experienced some unusual phenomena that were counter to the rheological trends of solid slurries experienced in the past. Upon further analysis it appeared that a slip phenomenon was occurring between the rotor being used in the measurement system and the coal-liquid slurries. In order to correct for the slip experienced, a profiled sensor was employed identical to the smooth sensor previously used with respect to length and diameter, but with vertical grooves approximately 1 mm wide by 1 mm deep evenly spaced around the rotor and running the full length of the rotor. Identical grooves were inside the walls of the cylinder. These grooves presented a surface that was more sensitive to the effects of the particles with respect to the overall slurry viscosity. The second phenomenon observed was the apparent migration of the particles away from the rotor as shear rate increased. This phenomenon can only be corrected by staying at a sufficiently low shear rate. The data obtained from a reevaluation of the solids volume percent, specific gravity and size distribution are presented graphically in figures 1 and 2. It is very evident when comparisons are made with the data presented in our second quarterly report that the profiled sensor system is more sensitive to the contribution of the solids to the overall slurry viscosity. Tests of the profiled sensor using Newtonian viscosity standards produced the same results as obtained with the smooth sensor. (ERA citation 06:023071)

DOE/PETC/TR-81/2 PC **A06**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Hydroliquefaction of Coal with Supported Catalysts: 1980 Status Review.
L. M. Polinski, G. J. Stiegel, and R. E. Tischer.
Jun 81, 124p

The objectives of the program have been to determine catalyst deactivation kinetic models and catalyst deactivation modes for supported Co-Mo and Ni-Mo catalysts used primarily in coal liquefaction via the H-COAL process. Emphasis has been on developing methods to increase catalyst usage by determining how to decrease catalyst replacement rates in the process and how to decrease catalyst poisoning. An important conclusion reached via model analysis and verified by experiment is that larger diameter (1/16 in.) catalysts resist poisoning deactivation much more than smaller (1/32 in.) catalysts over extended periods (60 to 110 hours) of time. If this trend can be verified, it gives a powerful tool for reducing catalyst

replacement rate in the H-COAL ebullated bed system by factors of 2 or more. A second conclusion is that poisoning of catalysts occurs by several possible mechanisms or modes. Indirect or direct evidence of all these modes can be presented, though the relative importance of each mechanism has not been established. The modes include (a) poisoning by coking - with gradual increase in C/H ratio (more refractory coke) with time, (b) poisoning by metallization (selective/non-selective adsorption of inorganics such as Ti and Fe on the catalyst), (c) sintering - increase in larger pores/decrease in surface area, and (d) parallel poisoning by irreversible nitrogen compound adsorption. (ERA citation 06:023028)

IS-4770 PC **A03**/MF **A01**
Ames Lab., IA.
Fossil Energy Quarterly Report, January 1, 1981-March 31, 1981.
May 81, 50p
Contract W-7405-ENG-82

This report covers objectives and progress for several areas of the Ames Laboratory Fossil Energy Program for the period January 1 through March 31, 1981. (ERA citation 06:023073)

LBL-12602 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Bioconversion of Cellulose. Work Progress for FY 1980.
C. R. Wilke, and H. W. Blanch. Mar 81, 75p
Contract W-7405-ENG-48

Progress is reported on the following: kinetic and mechanistic studies on cellulase enzymes, yeast nutrition, models of yeast growth and ethanol inhibition, by-product inhibition in cell recycle and vacuum fermentation, hollow fiber reactor, thermodynamics of ethanol-water systems, novel ethanol-water separations, and simultaneous and sequential cellulose fermenting organisms. (ERA citation 06:023281)

N81-26746/0 PC **A05**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
Stream Table Program: User's Manual and Program Document.
Final Report.
K. H. Hiles. May 81, 83p NASA-CR-161810
Contract NAS8-31640

This program was designed to be an editor for the Lewis Chemical Equilibrium program input files and is used for storage, manipulation and retrieval of the large amount of data required. The files are based on the facility name, case number, and table number. The data is easily recalled by supplying the sheet number to be displayed. The retrieval basis is a sheet defined to be all of the individual flow streams which comprise a given portion of a coal gasification system. A sheet may cover more than one page of output tables. The program allows for the insertion of a new table, revision of existing tables, deletion of existing tables, or the printing of selected tables. No calculations are performed. Only pointers are used to keep track of the data.

ORNL/FMP-81/1 PC **A18**/MF **A01**
Oak Ridge National Lab., TN.
AR And TD Fossil-Energy-Materials Program. Quarterly Progress Report, October-December 1980.
May 81, 424p
Contract W-7405-ENG-26

Progress is reported on the development of materials for coal liquefaction, coal gasification, heat engines and heat recovery, and combustion systems. (ERA citation 06:021513)

ORNL/TM-7795 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Fossil Energy Program. Progress Report for March 1981.
May 81, 126p
Contract W-7405-ENG-26

This report - the eightieth of a series - is a compendium of monthly progress reports for the ORNL research and development programs that are in support of the increased utilization of coal and other fossil fuel alternatives as sources of clean energy. The projects reported this month include those for coal conversion development, chemical research and development, materials technology, component development and process evaluation, technical support to major liquefaction projects, process analysis and engineering evaluations, fossil energy environmental analysis, flue gas desulfurization, coal preparation and waste utilization, plant control development, atmospheric fluidized bed coal combustor for cogeneration, Tennessee Valley Authority Fluidized Bed Combustion demonstration plant program technical support, PFBC systems analysis, fossil fuel applications assessments, performance assurance system support for fossil energy projects, international energy technology assessment, and generalized equilibrium models of liquid and gaseous fuel supplies. (ERA citation 06:022995)

PATENT-4 230 682
Not available NTIS
Department of Energy, Washington, DC.
Cyclic Thermochemical Process for Producing Hydrogen Using Cerium-Titanium Compounds.
Patent.
C. E. Bamberger. Filed 11 Jun 79, patented 28 Oct 80, 6p PAT-APPL-6-047 447
Supersedes PAT-APPL-6-047 447.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A thermochemical cyclic process for producing hydrogen employs the reaction between ceric oxide and titanium dioxide to form cerium titanate and oxygen. The titanate is treated with an alkali metal hydroxide to give hydrogen, ceric oxide, an alkali metal titanate and water. Alkali metal titanate and water are boiled to give titanium dioxide which, along with ceric oxide, is recycled. (ERA citation 06:023242)

PB81-216384 PC **A05**/MF **A01**
Resource Planning Associates, Inc., Cambridge, MA.
Steps to Ensure the Viability of the Residential Fuel Oil Distribution System.
Final rept.,
Peter Bos. Oct 80, 99p
Contract SBA-5634-0A-80

The study includes three major tasks: (1) identification and selection of problems for analysis which are crucial to the market viability of fuel oil dealers; (2) development and testing of hypotheses for possible causative factors behind each problem; (3) analysis and identification of the causes and effects of each problem and determination of appropriate corrective actions.

PB81-220840 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
EPA Evaluation of the Autosaver Under Section 511 of the Motor Vehicle Information and Cost Savings Act.
Technical rept.,
Edward Anthony Barth. May 81, 26p EPA-AA-TEB-511-81-3

The document announces the conclusions of the EPA evaluation of the 'Autosaver' device under provisions of section 511 of the Motor Vehicle Information and Cost Savings Act. On April 16, 1980 the EPA received a request from Mr. Y. Mori for evaluation of a fuel saving device termed 'Autosaver'. This device is designed for use on conventional, contact point, ignition systems. This device is claimed to save fuel and reduce pollution by instantaneously providing the high voltage to the spark plugs in an ideal manner.

PB81-221301 PC **A05**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Coal Gasifier Parameters Influencing Environmental Pollutant Production,
D. A. Green, J. G. Cleland, D. P. Daugherty, W. J. McMichael, and F. O. Mixon. Jun 81, 95p RTI/1934/00-03F, EPA-600/7-81-098
Grant EPA-R-804979
See also PB-287 730.

A series of fixed-bed coal gasification and pyrolysis tests have been performed in a laboratory-scale reactor of 6.6 cm inside diameter. Chemical analyses were conducted on the product gas, the aqueous condensate, the tar, and the solid residue from the tests. The effects of process variables, such as feed mode, catalytic treatment, pressure, mesh size, and coal type, upon byproduct and pollutant yields are described. The production of gaseous sulfur compounds, benzene and derivatives (BTX), phenolics (phenol, cresols, and xylenols), and tar have been measured, and the fate of trace elements such as arsenic, selenium, and lead has been determined. Byproduct production associated with the pyrolysis phase of gasification has been investigated with emphasis on the effects of particle size, residence time, and atmosphere. Experiments conducted with six U.S. coals ranging from lignite to anthracite are described. Continuous operation was found to result in greatly reduced tar and phenolic production. When the entire mass of coal was introduced at the beginning of the test, effluent stream compositions more closely approached those of larger scale, fixed-bed gasifiers. Initial work on this project was reported in PB-287720; three more recent reports were EPA-600/7-79-200 through EPA-600/7-79-202.

PB81-221319 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Alkali Vapor Transport in Coal Conversion and Combustion Systems.
Interim rept.,
J. W. Hastie, E. R. Plante, and D. W. Bonnell. May 81, 80p NBSIR-81-2279

Alkali metal-containing vapor species are ubiquitous in coal coversion and combustion systems. These species originate from coal mineral and atmospheric impurities (organic and inorganic) and from ceramic construction materials. Alternatively, they are present as additives, such as with potassium seeding for MHD or with bulk glass as a particle absorbing medium, or with dolomite in fluidized bed systems. Alkali vapor transport over representative slag, glass, and simple halide, hydroxide, and sulfate systems is discussed in relation to materials and process limitations in coal-supported energy systems. Problems associated with molecular-level vapor transport measurements are also considered.

PB81-221889 PC **A06**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Assessment of Hazard Potential from Combustion of Wastes in Industrial Boilers.
Final rept. Jun 80-Apr 81,
J. W. Harrison, J. B. White, and W. J. King. Jul 81, 122p EPA-600/7-81-108
Contract EPA-68-02-3170

The report gives results of a study to determine the extent of the present onsite use of waste fuel in industrial boilers and related process equipment, the nature and quantities of the materials so disposed of, and current regulations concerning such use. The study responds to a request for comment and advice on recently promulgated hazardous waste regulations that allow the onsite use of wastes as fuels with few restrictions. Based on contacts with federal, state, and local environmental protection officials, industry personnel, and the open literature, the study concludes that: a wide variety of materials have been burned as fuel in standard or appropriately modified combustion equipment; the practice can be expected to expand due to the economic pressures of hazardous waste disposal and rising fossil fuel costs; virtually no emission data on waste fuel combustion (except through incineration) is available; under conditions of inefficient combustion, significant particulate matter and high molecular weight (including polycyclic organic compounds) emission rates can be expected; and, within the scope of this study, no current regulations were found to be directed specifically at waste combustion. The study recommends increased industry contacts, representative site selection, and a field program in conjunction with a coordinated regulatory program.

PB81-222309 PC **A05**/MF **A01**
TRW, Inc., McLean, VA.
Environmental Research Plan for Gas Supply Technologies. Volume I: Executive Summary.
Final rept.,
L. M. Tipton, and P. D. Junkin. 29 May 81, 78p
GRI-80/0013.1
Contract GRI-5080-351-0316
See also Volume 2, PB81-222317.

TRW has assembled a five-year research plan on the environmental impacts and constraints associated with gas supply technologies for use by GRI as a basic planning document. The plan identifies specific environmental research needs based on state-of-the-art technology and current environmental knowledge. Technologies considered include those producing unconventional natural gas (tight gas sands, Devonian shale, coalbed methane, and geopressured methane), SNG from coal and peat and SNG from biomass (land-based, water-based and waste).

PB81-222317 PC **A08**/MF **A01**
TRW, Inc., McLean, VA.
Environmental Research Plan for Gas Supply Technologies. Volume II: Environmental Research Plan.
Final rept.,
L. M. Tipton, and P. D. Junkin. 29 May 81, 168p
GRI-80/0013.2
Contract GRI-5080-351-0316
See also Volume 1, PB81-222309.

The study was initiated with a review and analysis of Federal environmental regulations affecting gas supply technologies. An updated regulatory analysis appears in the final report. Next, the technological and environmental state of the art of each gas supply technology was analyzed with the help of a series of consultants recommended by GRI, each of whom is considered an expert in a given gas supply technology area. Based on regulatory requirements, technology status, and current environmental knowledge, the environmental issues associated with each technology area were identified. Environmental research being performed by government, industry and educational institutions was identified by computerized literature search and reviewed for applicability. Finally, recommended research activities for GRI funding were developed and a suitable prioritization methodology was devised.

PB81-223596 PC **A03**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Group.
Selectivity in Fischer-Tropsch Synthesis: Review and Recommendations for Further Work,
L. Caldwell. Jun 80, 42p CSIR-SR-CHNG-330

A broad product spectrum is obtained from the Fischer-Tropsch synthesis aimed at the production of gasoline and diesel fuels. This is a consequence of the carbon atom by carbon atom mechanism of chain growth. There is potential for narrowing the product spectrum by use of dual-function catalysts or transient process conditions.

PB81-224396 PC **E04**/MF **E04**
Open Univ., Milton Keynes (England). Energy Research Group.
Energy Requirements for the Conversion of Coal into Liquid Fuels.
Research rept.,
D. F. Hemming. May 77, 71p ERG-017

Calculations are made of the energy requirements of converting coal to liquid fuels. The processes treated in the study include (1) coal liquefication by direct hydrogenation, (2) motor fuel production by the CSF extraction hydrogenation process, (3) synthetic crude oil via coal pyrolysis, (4) motor fuel production by the Fischer-Tropsch process, and (5) methanol production by the Fischer-Tropsch process.

PB81-227977 PC **A03**/MF **A01**
Syracuse Univ. Research Corp., NY.
Clean Fuels from Bioconversion of Solar Energy.
Annual rept. 21 Jan 80-20 Jan 81,
Scott D. Feighner, and Harish C. Sikka. Mar 81, 26p GRI-80/0052
Contract GRI-5014-361-0265

The study seeks to enhance glycolic acid excretion by unicellular algae. The strains of algae selected to evaluate glycolic acid accumulation in culture medium were: Chlorella pyrenoidosa (UTEX 395), Chlamydomonas reinhardtii (UTEX 89), Scenedesmus obliquus (UTEX 393), and Ankistrodesmus braunii (UTEX 245). C. pyrenoidosa and C. reinhardtii, based on the amount of glycolic acid produced, were selected for further study. Initial experiments were conducted to measure the effect of different environmental growth conditions on the rate of glycolic accumulation in defined culture medium. The most pronounced effect on glycolic acid excretion was obtained by varying the concentration of carbon dioxide in air. At 1% CO2 in air, C. pyrenoidosa accumulated 5.2 ppm glycolic acid in culture medium. Neither the pH of the culture medium nor the incubation temperature affected glycolic acid accumulation by growing C. pyrenoidosa cultures.

PB81-227985 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Coll. of Engineering.
Computer Simulation and Molecular Theory Studies of Natural Gas Mixtures.
Annual rept.,
Keith E. Gubbins. 31 Dec 80, 17p GRI-80/0065
Contract GRI-5014-363-0119

Methods for predicting the properties of natural gas mixtures are needed that can be used with confidence for a wide variety of temperatures, pressures and compositions. At Cornell such methods are being developed by combining the methods of statistical thermodynaics and computer simulation.

PB81-868598 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solid Waste Pyrolysis Processes and Plants. January, 1976-July, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jul 81.
Jul 81, 101p

This bibliography covers various pyrolysis processes and processing plants for energy recovery and production of fuel gas from municipal and industrial solid wastes. Consideration is given to feasibility, economic analysis, performance, and environmental assessment of the process and plants. The bibliography excludes radioactive, agricultural, and biomass waste processing. (Contains 93 citations fully indexed and including a title list.)

PNL-SA-8812 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of Chemical and Mutagenic Properties of a Coal Liquid and a Shale Oil.
A. P. Toste, R. A. Pelroy, and D. S. Sklarew. Dec 80, 30p CONF-801039-10
Contract AC06-76RL01830
20. annual Hanford Life Sciences symposium, Richland, WA, USA, 19 Oct 1980.

A fuel distillate blend and a heavy distillate cut from SRC-II and a Paraho shale oil were chemically fractionated by Sephadex LH-20 chromatograhy, TLC and HPLC. Fractions were assayed for mutagenic activity by the Ames assay using Salmonella typhimurium TA98 with S9 and MFAO as metabolic activators. Fractions exhibiting mutagenic activity were characterized by GC-MS. The unfractionated Paraho shale oil was least mutagenic followed by the distillate blend and finally the heavy distillate cut. After Sephadex LH-20 chromatography, non-polar mutagens could not be detected in any of the synfuel samples; moderately polar mutagens made a small contribution to the samples total mutagenicity; most of the mutagenic activity appeared to be due to polar mutagens. After HPLC fractionation, the distillate blend exhibited non-polar mutagenic activity. The shale oil's mutagens ranged from moderately polar to polar. In contrast, the mutagens of the distillate blend and the heavy distillate cut were almost exclusively moderately polar. On the basis of the Ames assay with MFAO and the GC-MS analyses, primary aromatic amines appear to play a central role in the mutagenicity of the coal liquids. In contrast, amines do not appear to contribute as much to the activity of shale oil. (ERA citation 06:021516)

SAND-81-0769 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Catalytic Effects in Coal Gasification. Quarterly Report, October-December 1980.
T. D. Padrick, and D. D. Dees. May 81, 18p
Contract AC04-76DP00789

This quarterly report summarizes the activities of Sandia National Laboratories' program on mineral matter effects in coal gasification. The objective of this program is to develop a fundamental understanding of the mechanism of the catalytic effects of mineral matter on coal gasification, and to use this knowledge as the impetus for future process improvements. We have identified reduced iron as the catalytic form of pyrite in the hydrogasification of a Pittsburgh Seam coal. We have observed catalytic activity of reduced iron that depends on precursor species in the following order Fe sub 2 O sub 3 > Fe sub 3 O sub 4 > FeS sub 2 > Fe. We have also found that, for a given iron compound, the catalytic activity is strongly dependent on particle size, with increasing activity for smaller average particle size. Using 5% by weight Fe sub 2 O sub 3 (approx. 5 mu), we measured a factor of 15 increase in the hydrogasification rate for a Pittsburgh Seam coal at 1000 exp 0 C and one atmosphere H sub 2 . Determination of the product gas composition indicates that the increase in gasification rate results primarily in methane production with reduced iron catalyst. (ERA citation 06:023038)

UCID-19045 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Why Solar Oil Shale Retorting Produces More Oil.
W. R. Aiman. 20 May 81, 5p
Contract W-7405-ENG-48

A solar oil shale retorting process may produce higher oil yield than conventional processing. High oil yield is obtained for three reasons: oil carbonization inside of the shale is reduced, oil cracking outside of the shale is reduced, and oil oxidation is essentially eliminated. Unique capabilities of focused solar energy produce these advantages. An increase in yield will reduce the cost of mining and shale transportation per barrel of oil produced. These cost reductions may justify the increased processing costs that will probably be associated with solar oil shale retorting. (ERA citation 06:021611)

UCRL-85743 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Proposed Solar-Furnace Study of Zinc Sulfate Decomposition.
O. H. Krikorian, and P. K. Shell. 16 Apr 81, 7p
CONF-810469-1
Contract W-7405-ENG-48
Solar Thermal Test Facilities Users Association annual business and technical meeting, Pasadena, CA, USA, 20 Apr 1981.

A solar furnace study of zinc sulfate is proposed. In this study the advantages of the high temperatures and rapid heating rates provided by solar collectors for the decomposition of zinc sulfate will be investigated. The use of a rotary kiln designed to improve the efficiency in working with solids that have low absorbtivities, such as solid sulfates, is planned. The overall goal in this experiment is to establish the applicability of solar central receivers to thermochemical cycles that can use solid state sulfate decomposition as the high temperature step. The ZnSO sub 4 subcycle presents a number of operational advantages over the direct decomposition of H sub 2 SO sub 4 in the thermochemical process of hydrogen production from water. For instance, the cycle efficiency should increase due to reducing the heat requirements for evaporating water in the sulfuric acid concentration step. Also, a number of severe materials problems will be avoided for heat exchangers required to concentrate, boil, and decompose sulfuric acid. Furthermore, zinc sulfate lends itself well to coupling with solar central receivers, an alternative energy source which may introduce several additional advantages to sulfate-based thermochemical cycles. (ERA citation 06:021722)

21E. Jet and Gas Turbine Engines

AD-A100 783/0 PC **A14**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Aerodynamic Noise and Suppressors,
Dan Qun Fang. 29 May 81, 305p Rept no. FTD-ID(RS)T-1800-80
Edited trans. of Aerodynamic Noise and Suppressors (China) p1-245 1978.

No abstract available.

AD-A101 083/4 PC **A02**/MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.
Droplet Trajectories in Three-Dimensional Gas Turbine Flow Fields.
Interim rept.,
W. H. Ayers, F. Boysan, and J. Swithenbank. Sep 80, 21p HIC-355, AFOSR-TR-81-0543
Grant AFOSR-80-0174

Much work is currently being carried out in the field of mathematical modelling of the physical and chemical processes taking place within combustion equipment to enable better combustion chamber design. One aspect of this is the numerical prediction of burning droplet trajectories in a gas flow field and in this paper a general three-dimensional particle/droplet trajectory algorithm is presented and applied to fuel sprays in gas turbine combustors. Droplet evaporation and initial heating up effects are included and trajectories are calculated within a three-dimensional computer predicted gas flow field. By injecting many droplets with initial conditions representing a particular fuel nozzle a complete fuel spray can be constructed, and this is presented graphically. The results show that in some cases the three-dimensional nature of the gas flow and the behaviour of large droplets may be expected to have a significant effect on combustor performance. (Author)

AD-A101 084/2 PC **A03**/MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.
Pseudo Random Stimulus Response of Combustion Systems.
Interim rept.,
A. Turan, J. Swithenbank, S. A. Billings, and P. Salib. 1980, 33p HIC-340, AFOSR-TR-81-0544
Grant AFOSR-80-0174

Combustor modelling methods involving stirred reactor networks require information on the volumes, inter-connections, mixedness and flowrates of the individual reactors. It is here proposed that the response of the system to a pseudo-random binary sequence (PRBS) stimulus can be used advantageously to fulfill this need. A survey is presented of the theory of the technique and method of interpretation of the results. The practicability of the method has been invesitgated experimentally using a water model of a gas turbine combustor; salt solution tracer was introduced into the primary flow in a PRBS and the conductivity at different points throughout the chamber was used to determine the impulse response and Z-transform. The results confirmed the anticipated sensitivity of the technique. Finally, the extension of the technique to the quantitative identification of non-linear elements is presented. (Author)

AD-A101 102/2 PC **A12**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Computer Evaluation of the On-and-Off Design Performance of an Axial Air Turbine.
Master's thesis,
Robert Cirone. Mar 81, 268p

An existing code for calculating axial turbine performance using multiple stream surfaces was modified and made to run on the equivalent of an HP-1000 computer system. Calculations were made for the geometry of a 485 horsepower dual-discharge air-drive turbine for both on and off-design conditions. The results were compared with available data obtained at off-design speeds. Agreement of the flow rate and horsepower to within 5% was obtained. (Author)

DOE/ET/17005-1 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Gas Turbine Products Div.
Applications of Composite Gas Turbine Components. Phase I. Semi-Annual Technical Progress Report.
R. G. Kunkel. Mar 81, 27p
Contract AC01-80ET17005

Heavy-duty, air-cooled gas turbines utilize relatively large superalloy buckets and nozzle guide vanes. These large components, particularly buckets, must demonstrate a variety of properties. The airfoil vane requires excellent surface stability with high creep and low-cycle fatigue (LCF) strength. The dovetail requires excellent tensile strength and low-cycle fatigue (LCF) properties. Conventional buckets are fabricated as one single casting or forging in which compromises in these properties are inevitable, and the full capabilities of the superalloys used are rarely optimized along each individual line. A unique approach toward improved performance in key properties is to integrate the best material for each part of a hot section bucket or nozzle into a bonded composite component, or a hybrid component. A hybrid bucket is a superalloy part composed of a variety of alloys bonded into one integral part. Each segment is tailored to perform a specific function with greater reliability and performance than possible with contemporary monolithic parts. An example is a directionally-solidified (DS) airfoil vane bonded to a dovetail section of forged/PM superalloy. Several nickel base superalloy combinations which have been diffusion bonded using hot isostatic pressing (HIP). This technique enables large gas turbine buckets to be fabricated using materials with improved creep and low cycle fatigue life for the airfoil and greater high temperature tensile strength in the dovetail. The program will specifically investigate three directionally solidified airfoil alloys and two powdered metal dovetail alloys. This effort will include heat treat studies, physical metallurgy and high temperature tensile testing for all 5 alloys in their HIP bonded condition. (ERA citation 06:023417)

NASA-CR-165313 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Structures, Performance, Benefit, Cost Study.
Final rept.,
E. Feder. Apr 81, 78p PWA-5706-16
Contract NAS3-22050

Aircraft engine structures were studied to identify the advanced structural technologies that would provide the most benefits to future aircraft operations. The following procedure was used. First, a series of studies identified engine systems with the greatest potential for improvements. Based on these studies six advanced generic structural concepts were selected and conceptually designed. Quantitative assessments were made of the benefits of each concept in terms of thrust specific fuel consumption, weight, cost, maintenance cost, fuel burned and direct operating cost plus interest. The probability of success of each concept was also determined. The concepts were ranked and the three most promising were selected for further study. This consisted of identifying and comprehensively outlining the advanced technologies required to develop these concepts for aircraft engine application. Analytic, fabrication and test technology developments are required. The technology programs outlined emphasize the need to provide basic, fundamental understanding of technology to obtain the benefit goals.

N81-26075/4 PC **A07**/MF **A01**
Vought Corp., Dallas, TX.
Additional Testing of the Inlets Designed for a Tandem Fan V/STOL Nacelle.
A. H. Ybarra. Jun 81, 148p NASA-CR-165310, TR-2-53020/IR-52726
Contract NAS3-21468

The wind tunnel testing of a scale model of a tandem fan nacelle designed for a type (subsonic cruise) V/STOL aircraft configuration is discussed. The performance for the isolated front inlet and for the combined front and aft inlets is reported. Model variables include front and aft inlets with aft inlet variations of short and long aft inlet cowls, with a shaft simulator and diffuser vortex generators, cowl lip fillets, and nacelle strakes. Inlet pressure recovery, distortion, and inlet angle-to-attack separation limits were evaluated at tunnel velocity from 0 to 240 knots, angles-of-attack from -10 to +40 degrees and inlet flow rates corresponding to throat Mach number from 0.0 to 0.6. Combined nacelle pitch and yaw runs up to 30 deg. were also made.

N81-26145/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Turbine Bypass Engine: A New Supersonic Cruise Propulsion Concept.
L. C. Franciscus. 1981, 15p NASA-TM-82608, E-855
Presented at the 17TH Joint Propulsion Conf., Colorado Springs, 27-29 Jul. 1981; Sponsored by Aiaa, Sae, and Asme.

Engine performance and mission studies were carried out for a single-spool Turbine Bypass Engine concept. Comparisons were made between the TBE, a conventional single-spool turbojet, and the Pratt & Whitney Variable Stream Control Engine. The airplane assumed for the study was a Mach 2.32 commercial supersonic transport. The nominal mission was a 4000-nautical miles total range with a 300-nautical miles subsonic cruise leg. The figure of merit was the minimum takeoff gross weight for the mission. Comparisons of the three engines were also made for the 4000-nautical miles total range with longer subsonic cruise legs.

N81-26146/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Small Gas-Turbine Combustor Study: Fuel Injector Evaluation.
C. T. Norgren, and S. M. Riddlebaugh. 1981, 20p NASA-TM-82641, E-891
Presented at the Joint Propulsion Conf., Colorado Springs, 27-29 Jul. 1981; Sponsored by Aiaa, Sae, and Asme.

As part of a continuing effort at the Lewis Research Center to improve performance, emissions, and reliability of turbine machinery, an investigation of fuel injection technique and effect of fuel type on small gas turbine combustors was undertaken. Performance and pollutant emission levels are documented over a range of simulated flight conditions for a reverse flow combustor configuration using simplex pressure-atomizing, spill-flow return, and splash cone airblast injectors. A parametric evaluation of the effect of increased combustor loading with each of the fuel injector types was obtained. Jet A and an experimental referee broad specification fuel were used to determine the effect of fuel type.

N81-26147/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Testing of Ceramic Gas Turbine Components under Service-Like Conditions.
W. Siebmanns. Apr 80, 10p NASA-TM-75781
Contract NASW-3198
Transl. Into English from Berichte der Deutschen Keramische Gesellschaft (Germany, F.R.), V. 55, No. 8, 1978 p 406-409. Transl. By Scientific Translations Inc., Santa Barbara, Calif.

The German firm MTU, Munich, West Germany, is developing gas turbine components made of special ceramics (silicon nitride, silicon carbide) which can withstand temperatures up to 1600 K. Various components such as the combustor and turbine wheel are being developed. Various preliminary tests of components are discussed.

N81-26492/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Aeroelastic Characteristics of a Cascade of Mistuned Blades in Subsonic and Supersonic Flows.
R. E. Kielb, and K. R. V. Kaza. 1981, 18p NASA-TM-82631, E-886
Grant NSG-3139
Proposed for Presentation at the 8TH Biennial Eng. Div. Conf., Hartford. Conn., 20-23 Sep. 1981; Sponsored by the American Society of Mechanical Engineers.

The effects of mistuning on flutter and forced response of a cascade in subsonic and

supersonic flow were investigated. The aerodynamic and structural coupling between the bending and torsional motions and the aerodynamic coupling between the blades were studied. It is shown that frequency mistuning always has a beneficial effect on flutter. For the cascade considered, the potential for raising flutter speed is greater in subsonic than in supersonic flow. Preliminary results for structural damping mistuning show that there are no additional benefits over adding damping mistuning may have either a beneficial or an adverse effect on forced response, depending on the engine order of the excitation and Mach number.

N81-26844/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
New Technique for the Direct Measurement of Core Noise from Aircraft Engines.
E. A. Krejsa. 1981, 25p NASA-TM-82634, E-859
Presented at the 17TH Joint Propulsion Conf., Colorado Springs, 27-29 Jul. 1981; Cosponsored by the Aiaa, Sae, and Asme.

The core noise levels from gas turbine aircraft engines were measured using a technique which requires that fluctuating pressures be measured in the far field and at two locations within the engine core. The cross spectra of these measurements are used to determine the levels of the far-field noise that propagated from the engine vore. The technique makes it possible to measure core noise levels even when other noise sources dominate. The technique was applied to signals measured from an Avco Lycoming YF102 turbofan engine. Core noise levels as a function of frequency and radiation angle were measured and are presented over a range of power settings.

21G. Reciprocating Engines

PB81-872541 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lubrication and Wear of Pistons and Piston Rings. January, 1973-July, 1981 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for Jan 73-Jul 81.
Jul 81, 64p

The lubrication and wear resistance of pistons and piston rings are considered. Topics include the use and design of oil seals, as well as the properties of thin lubricating films. The use of molybdenum disulfide based lubricants is also included. (Contains 54 citations fully indexed and including a title list.)

21H. Rocket Motors and Engines

AD-A100 891/1 PC **A02**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
A Method for the Correction of Finite Rise Time Effects in the Characterization of Non Linear viscoelastic Materials.
Final rept. Oct 80-Jan 81,
E. G. Powell. Feb 81, 8p Rept no. NSWC/MP-81-67

a method is presented for the correction of the effect of finite rise time upon stress relaxation experiments. The basis for the correction relies on the Farris nonlinear homogeneous theory. In the limit of zero nonlinearity the correction is shown to agree with the correction by linear theory. In the limit of very strong nonlinearity the correction is achieved by redefining the zero of time to be at the end of the rise time. (Author)

AD-A100 945/5 PC **A04**/MF **A01**
Dayton Univ., OH. Research Inst.
Numerical Techniques for Solving Nonlinear Instability Problems in Smokeless Tactical Solid Rocket Motors.
Final rept. 15 Feb-30 Sep 80,
Joseph D. Baum, and J. N. Levine. Apr 81, 53p UDR-TR-80-106, AFRPL-TR-80-78
Contract F04611-77-C-0042

The results of an investigation to select a satisfactory numerical method for calculating the propagation of steep fronted shock like waveforms in a solid rocket motor combusion chamber are presented. A number of different numerical schemes were evaluated by comparing the results obtained for three problems: the shock tube problem, the linear wave equation, and nonlinear wave propagation in a closed tube. The most promising method--a combination of the Lax-Wendroff, Hybrid and Artificial Compression techniques was incorporated into an existing non-linear instability program. The capability of the modified program to treat steep fronted wave instabilities in low smoke tactical motors was verified by solving a number of motor test cases with disturbance amplitudes as high as 80% of the mean pressure. (Author)

AD-A101 185/7 PC **A05**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
External Burning Propulsion Analysis (EBPA). User's Manual.
Rept. for 20 Sep 79-15 Dec 80,
J. C. Davis, and D. W. Harvey. Apr 81, 79p MDC-G9474, AFRPL-TR-81-05
Contract F04611-79-C-0046

This user's manual provides instructions to initiate, run, and terminate the External Burning Propulsion Analysis (EBPA) computer program. Details are given of inputs, processing flow, instructions for use, outputs (including loadsheets for sample case), operating messages, troubleshooting, and requisite hardware and support software. The program was developed for operation on the CDC 6400/7600 and CYBER 174 computing systems, but its machine dependency has been minimized. The EBPA program is self-contained and requires no communication with outside programs. In addition to the program tape, a single chemistry data tape is required for its operation. (Author)

N81-26460/8 PC **A08**/MF **A01**
Rocketdyne, Canoga Park, CA.
High-Pressure Hot-Gas Self-Acting Floating Ring Shaft Seal for Liquid Rocket Turbopumps.
Final Report, Mar. 1975 - Sep. 1980.
R. E. Burcham, and W. A. Diamond. Sep 80, 251p NASA-CR-165392, RI/RD80-186
Contract NAS3-19425

Design analysis, detail design, fabrication, and experimental evaluation was performed on two self acting floating ring shaft seals for a rocket engine turbopump high pressure 24132500 n/sq m (3500 psig) hot gas 533 K 9500 F) high speed 3142 rad/sec (30000 rmp) turbine. The initial design used Rayleigh step hydrodynamic lift pads to assist in centering the seal ring with minimum rubbing contact. The final design used a convergent tapered bore to provide hydrostatic centering force. The Rayleigh step design was tested for 107 starts and 4.52 hours total. The leakage was satisfactory; however, the design was not acceptable due to excessive wear caused by inadequate centering force and failure of the sealing dam caused by erosion damage. The tapered bore design was tested for 370 starts and 15.93 hours total. Satisfactory performance for the required life of 7.5 hours per seal was successfully demonstrated.

SPACE TECHNOLOGY

22A. Astronautics

N81-26160/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
EVA Assembly of Large Space Structure Element.
L. J. Bement, H. G. Bush, W. L. Heard, Jr., and J. W. Stokes, Jr. Jun 81, 38p NASA-TP-1872, L-14353

The results of a test program to assess the potential of manned extravehicular activity (EVA) assembly of erectable space trusses are described. Seventeen tests were conducted in which six 'space-weight' columns were assembled into a regular tetrahedral cell by a team of two 'space'-suited test subjects. This cell represents the fundamental 'element' of a tetrahedral truss structure. The tests were conducted under simulated zero-gravity conditions. Both manual and simulated remote manipulator system modes were evaluated. Articulation limits of the pressure suit and zero gravity could be accommodated by work stations with foot restraints. The results of this study have confirmed that astronaut EVA assembly of large, erectable space structures is well within man's capabilities.

N81-26166/1 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Structural Dynamics and Control of Large Space Structures.
E. B. Lightner. Jun 81, 136p NASA-CP-2187, L-14609
Proc. Held at Hampton, VA., 30-31 Oct. 1980.

The focus of the workshop was the basic research program assembled by LaRC to address the fundamental technology deficiencies that were identified in several studies on large space systems (LSS) conducted by NASA in the last several years. The staffs of the respective participants were assembled at the workshop to review the current state of research in the control technology for large structural systems and to plan the efforts that would be pursued by their respective organizations.

N81-26744/5 PC **A09**/MF **A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
A Study of Software Management and Guidelines for Flight Projects.
Interim Report.
9 Apr 80, 182p NASA-CR-164525
Contract NASW-3350

A survey of present software development policies and practices, and an analysis of these policies and practices are summarized. Background information necessary to assess the adequacy of present NASA flight software development approaches is presented.

N81-27034/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Aerospace Safety Advisory Panel's Report to Doctor Robert a. Frosch, 1977.
1978, 47p NASA-TM-82377

Risks attendant to NASA's operations are identified for the following: mission operations; orbiter readiness for orbital flight tests; space shuttle main engine; avionics; thermal projection system; hazard assessment; human error. Past and future projects are assessed.

22B. Spacecraft

AD-A100 622/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Characteristics of Cosmic Ray Cutoffs for a Satellite Orbiting at 400 KM; The Effect of the Solid Earth,
D. F. Smart, M. A. Shea, and J. E. Humble. 1981, 6p Rept no. AFGL-TR-81-0148
Pub. in Adv. Space Res., v1 p165-168 1981.

No abstract available.

AD-A100 846/5 PC **A10**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Conceptual Design and Analysis of Orbital Cryogenic Liquid Storage and Supply Systems.
Final rept. Dec 79-Mar 81,
Ralph N. Eberhardt, G. R. Cunnington, and William A. Johns. May 81, 205p MCR-81-546, NASA-CR-165321
Contract NAS3-22264

A wide variety of orbital cryogenic liquid storage and supply systems are defined in NASA and DOD long-range plans. These systems include small cooling applications, large chemical and electrical orbit transfer vehicles and resupply tankers. All have the common requirements of low-g fluid management to accomplish gas-free liquid expulsion and efficient thermal control to manage heat leak and tank pressure. A preliminary design study was performed to evaluate tanks ranging from 0.6 to 37.4 cu. 3 (22 to 1320 cu. ft). Liquids of interest were hydrogen, oxygen, methane, argon and helium. Conceptual designs were generated for each tank system and fluid dynamic, thermal and structural analyses were performed for Shuttle compatible operations. Design trades considered the paradox of conservative support structure and minimum thermal input. Orbital performance and weight data were developed, and a technology evaluation was completed. (Author)

N81-26154/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Correlation of Predicted and Flight Derived Stability and Control Derivatives with Particular Application to Tailless delta Wing Configurations.
J. Weil. Jul 81, 42p NASA-TM-81361

Flight derived longitudinal and lateral-directional stability and control derivatives were compared to wind-tunnel derived values. As a result of these comparisons, boundaries representing the uncertainties that could be expected from wind-tunnel predictions were established. These boundaries provide a useful guide for control system sensitivity studies prior to flight. The primary application for this data was the space shuttle, and as a result the configurations included in the study were those most applicable to the space shuttle. The configurations included conventional delta wing aircraft as well as the X-15 and lifting body vehicles.

N81-26164/6 PC **A05**/MF **A01**
Communications Satellite Corp., Clarksburg, MD.
Geostationary Platforms Mission and Payload Requirements Study. Volume 1: Executive Summary.
Final Report, 12 Oct. 1978 - 18 Oct. 1979.
30 Oct 79, 93p NASA-CR-161807
Contract NAS8-33226

Time-phased missions and payloads for potential accommodation on geostationary platforms and the engineering requirements placed upon the platform housekeeping elements by selected payloads are identified. Optimum locations for geostationary platforms, potential missions and their characteristics, and potential user requirements were determined as well as the interface requirements between the missions and h the geostationary platform. A payload data book was prepared and antenna tradeoff studies were conducted. Payload missions are defined in terms of frequencies, power, beam patterns, interconnections, support requirements, and other characteristics.

N81-26165/3 PC **A08**/MF **A01**
Communications Satellite Corp., Clarksburg, MD.
Geostationary Platforms Mission and Payload Requirements Study. Volume 2: Technical.
Final Report, 12 Oct. 1978 - 18 Oct. 1979.
30 Oct 79, 151p NASA-CR-161808
Contract NAS8-33226

The possibility of using geostationary platforms to provide communications and other services was examined. Detailed data on the payload and housekeeping requirements of selected communications missions and one typical noncommunications mission are presented.

N81-26168/7 PC **A06**/MF **A01**
Wichita State Univ., KS. Dept. of Aeronautical Engineering.
An Exploratory Investigation of Weight Estimation Techniques for Hypersonic Flight Vehicles.
E. L. Cook. 1981, 112p NASA-CR-164420
Contract NCC1-21

The three basic methods of weight prediction (fixed-fraction, statistical correlation, and point stress analysis) and some of the computer programs that have been developed to implement them are discussed. A modified version of the WAATS (Weights Analysis of Advanced Transportation Systems) program is presented, along with input data forms and an example problem.

N81-26172/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Proposed Dynamic Phase Difference Method for the Detection of Tile Debonding from the Space Shuttle Orbiter.
A. J. Zuckerwar, and D. R. Sprinkle. Jun 81, 14p NASA-TM-83140

A noncontracting, semi-global, dynamic technique was developed for detecting loose tiles on the space shuttle orbiter. In laboratory tests on a single tile, the substrate was excited into lateral motion at a constant frequency and amplitude of 2g. The phase relationship between the motions of tile and substrate was examined by noncontacting probes in order to relate the dynamic properties of the tile SIP system to its fatigue history; by a visual technique using a stroboscope and split screen video monitor for practical application in the field. When the substrate is excited at an appropriate frequency (between 30 and 60 Hz), a good tile moves in phase and a loose tile out of phase with the substrate. The out of phase motion is readily observable in the form of a 'beat' between the tile and a reference marker on the substrate.

22C. Spacecraft Trajectories and Reentry

PB81-221707 Not available NTIS
National Bureau of Standards, Washington, DC.
The Main Problem in the Theory of Artificial Satellites to Order Four.
Final rept.,
A. Deprit. Apr 81, 6p
Pub. in Jnl. of Guidance and Control 4, n2 p201-206 Mar-Apr 81.

Software programs are designed to normalize the main problem in the theory of artificial satellites. At the onset, a canonical transformation of a new type, called the elimination of the parallax, reduces the system to a quasi-Keplerian one with varying angular momentum. As the first phase in a stepwise refinement, a separate radial intermediary is extracted from the simplified Hamiltonian; its normalization by a Poincare transformation executed is by a machine to the fourth order in closed form, that is to say, without developing the generator in powers of the eccentricity.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

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FAST FOURIER TRANSFORMATIONS
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm.
PB80-104045 33

Keyword term
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ABANDONMENT
Hazardous Surface Openings to Abandoned Underground Mine - Nevada.
PB81-223414 4701

ABRES
Thermal and Structural Analysis of Training Round Nose Caps.
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ABSORPTION COEFFICIENTS
Determination of Integrated Optical Thickness of Clouds from Lunar Irradiance Measurements.
AD-A100 700/4 4798

ABSORPTION SPECTRA
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AD-A101 007/3 4634

Piezo-Optical Determination of Deformation Potentials Relevant to Transport Properties Calculations of Multivalley Semiconductors.
AD-A101 120/4 4804

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Cometary Particulate Analyzer Design Definition Study.
N81-27028/2 4632

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Social Learning Theory and Sex Roles: Violence Begins in the Home.
SHR-0040099 4655

Domestic Abuse Act (Order for Protection): The 'How To' Packet.
SHR-0040144 4655

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SHR-0040301 4655

Films and Videotapes on Spouse Abuse.
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Problem Statement: Battered Women. A National Concern.
SHR-0040303 4655

Funding Family Violence Programs: State, Local, and Private Sources of Funds.
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SHR-0040305 4656

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SHR-0040307 4656

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SHR-0005895 4655

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Capacitor Technologies, Applications and Reliability.
N81-26372/5 4704

ACCIDENT INVESTIGATIONS
Pipeline Accident Report - Union Light, Heat and Power Company, Natural Gas Explosion and Fire, Simon Kenton High School, Independence, Kentucky, October 9, 1980.
PB81-207102 4767

Bicyclists' Inclination and Ability to Search Behind Before Turning Left.
PB81-216608 4767

Aircraft Accident Report--Kellogg Company Avions Marcel Dassault Breguet Falcon 10, N253K, Meigs Field, Chicago, Illinois, January 30, 1980.
PB81-910406 4768

Aircraft Accident Report - Continental Airlines/Air Micronesia, Inc. Boeing 727-92C, N18479, Yap Airport, Yap, Western Caroline Islands, November 21, 1980.
PB81-910407 4624

ACCIDENT PREVENTION
Systematic Studies for Improving Injury Protection in Alpine Skiing and the Concept of a New Ski-Binding System (Systematische Untersuchung zur Verbesserung des Verletzungsschutzes im Alpinen Skilauf und Konzeption eines Neuen Skibindungssystems),
PB81-215568 4657

Development of Test of Selected Model Pedestrian Safety Regulations.
PB81-219297 4768

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Pipeline Accident Report - The Pipelines of Puerto Rico, Inc., Petroleum Products Pipeline Rupture and Fire, Bayamon, Puerto Rico, January 30, 1980,
PB81-204851 4767

Pedestrian Fatalities: A Comparison of Experience in the United States of America and in South Africa during the Year 1976-1978.
PB81-216251 4767

Multipiece Rims for Trucks, Buses, and Trailers-Economic Effects Caused by Further Regulation of Rims in Standard No. 120.
PB81-221939 4762

Comparative Study of the Medical-Legal Aspects of Post-Vaccination Complications in the Member States of the European Community (Etude Comparative des Aspects Medico-Legaux des Complications Post-Vaccinales dans les Etats Membres de la Communaute Europeenne),
PB81-222986 4670

ACCOUNTING
Status, Progress, and Problems in Federal Agency Accounting During Fiscal 1980.
PB81-223273 4638

ACID ELECTROLYTE FUEL CELLS
Technology Development for Phosphoric Acid Fuel Cell Powerplant (Phase II): 7TH Quarterly Report.
DOE/NASA/0067-79-6 4719

Fuel Cell Oxygen Electrode.
PATENT-4 232 097 4721

ACID RAIN
Acid Rain Information Book. Final Report.
DE81024267 4745

ACIDIFICATION
Response of Phytoplankton to Acidification in Experimental Streams.
PB81-216822 4680

ACOUSTIC ARRAYS
Simulation of Underwater Diversity Array.
AD-A100 706/1 4775

Multipath in the Three-Dimensional Underwater Array.
AD-A100 707/9 4775

ACOUSTIC ATTENUATION
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AD-A100 715/2 4794

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AD-A100 791/3 4794

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AD-A101 124/6 4725

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AD-A101 146/9 4726

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The Effect of Activation Energy on Tubular Reactor Multiplicity.
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ACTIVE CONTROL
Overview of Langley Activities in Active Controls Research.
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Application of Constrained Optimization to Active Control of Aeroelastic Response.
N81-26495/4 4623

Qualitative Comparison of Calculated Turbulence Responses with Wind-Tunnel Measurements for a DC-10 Derivative Wing with an Active Control System.
N81-26496/2 4623

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AI01-80ER10160
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AID/AFR-C-1364
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AID/AFR-C-1469
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AID-DSAN-C-0081
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F49620-79-C-0098
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Ohio State Univ., Columbus. Dept. of Statistics.
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Polytechnic Inst. of New York, Farmingdale. Microwave Research Inst.
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Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
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Washington Univ., Seattle. Dept. of Psychology.
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N00014-79-C-0757
Pennsylvania State Univ., University Park. Dept. of Industrial and Management Systems Engineering.
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N00014-79-C-0866
California Univ., Los Angeles. Dept. of Computer Science.
AD-A101 127/9 4707

N00014-79-C-0873
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
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California Inst. of Tech., Pasadena.
AD-A100 583/4 4711

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California Univ., San Diego, La Jolla. Inst. for Pure and Applied Physical Sciences.
AD-A101 170/9 4799

N00014-80-C-0014
Duke Univ., Durham, NC. Graduate School of Business Administration.
AD-A100 993/5 4649

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Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A100 969/5 4702

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Duke Univ., Durham, NC. Graduate School of Business Administration.
AD-A101 132/9 4641

N00014-80-C-0159
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N00014-80-C-0322
Missouri Univ.-Rolla. Dept. of Mathematics.
AD-A100 916/6 4734

N00014-80-C-0442
Northrop Research and Technology Center, Palos Verdes Peninsula, CA.
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